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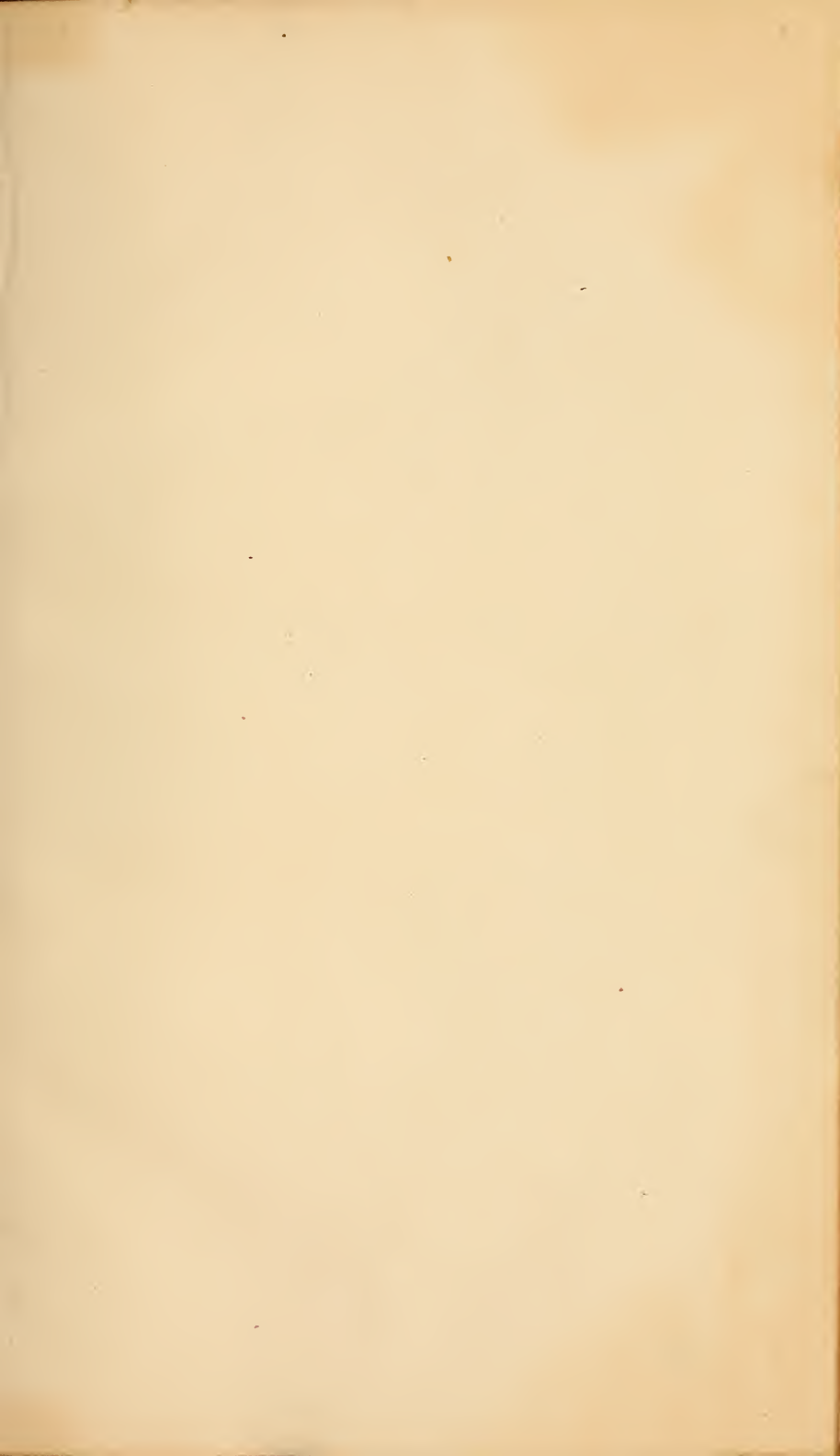
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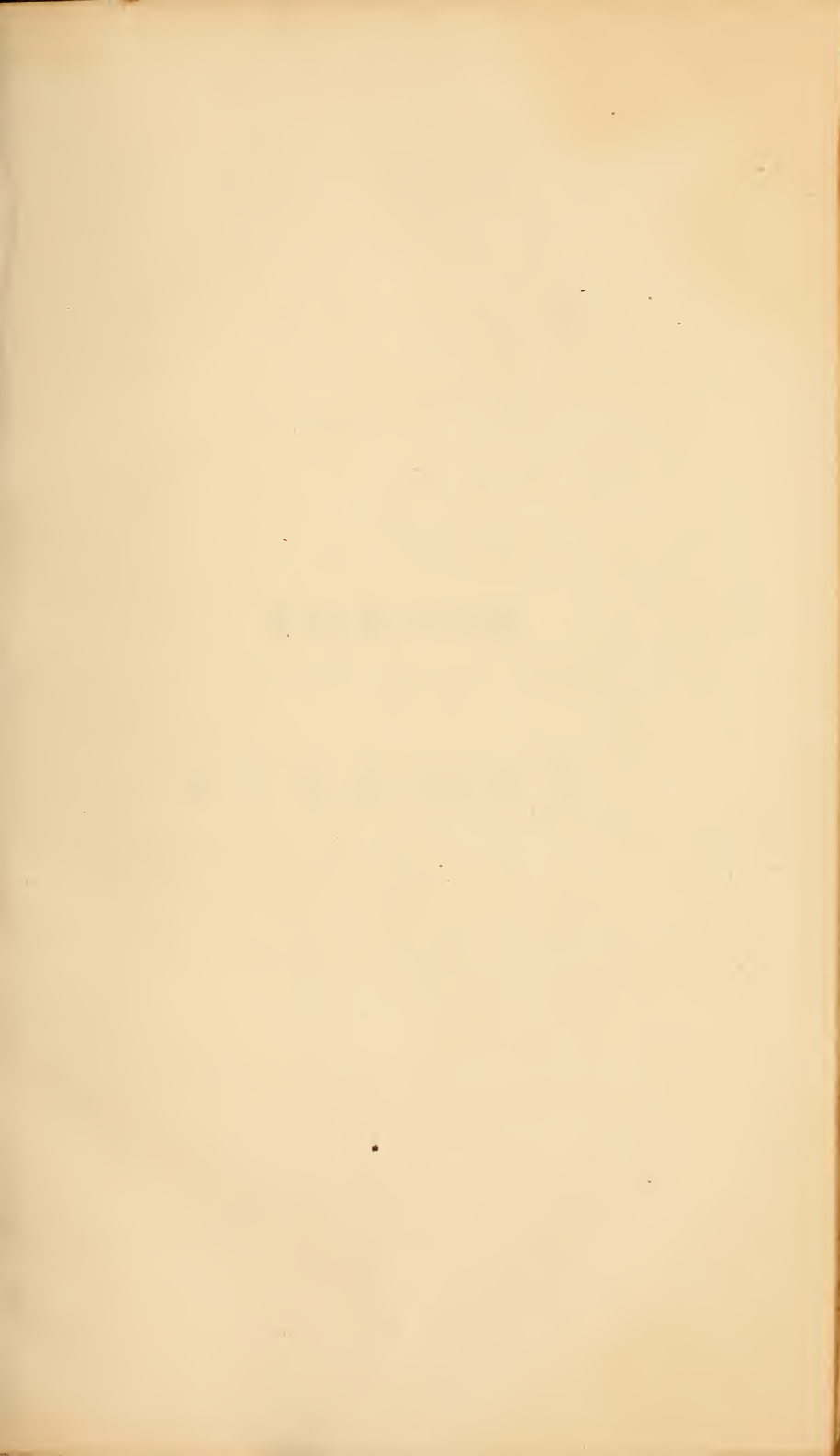
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A

HAND-BOOK

OF

S U R G E R Y.

A
H A N D - B O O K
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S U R G E R Y :
With Fifty Illustrations.
BEING A PORTION OF
AN ANALYTICAL COMPENDIUM
O F T H E
V A R I O U S B R A N C H E S O F M E D I C I N E .

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S U R G E R Y.

INFLAMMATION.

THE definitions of inflammation vary with different authors. That of Miller is as satisfactory as any other. He defines inflammation to be "a perverted condition of the blood and blood-vessels of a part interrupting its healthful function, and changing its normal structure; ordinarily attended with redness, pain, heat, and swelling; and inducing more or less disturbance of the general system." The term should be limited to processes *essentially morbid*.

The transition from health to inflammation may be divided into three stages: 1. Simple vascular excitement; 2. Active congestion; 3. True inflammation.

1. *Simple Vascular Excitement*.—When any irritant is applied to the skin, an impression is produced through the nervous system which is manifested particularly in the blood-vessels.

At first the blood circulates with great rapidity, although the small arteries and capillaries are of diminished calibre. Afterwards the vessels yield and are dilated, and an increased quantity of blood circulated with great rapidity, with a tendency to serous and plastic exudation. The function of the part is exalted, and this may be manifested by excessive nutrition or secretion. This is simple vascular excitement.

2. *Active Congestion*.—More blood is sent to the part, and the capillaries and minute arteries begin to give way under the increased pulsation of larger arterial trunks; by over-distension, the vascular coats lose their tonicity. "And partly from this cause, partly on account of change in the blood itself, which seems more viscid, with its corpuscles less distinct, and, when examined by the microscope, is found especially to possess an increased number of colourless 'lymph globules,' unusually adhesive to each other, and to the walls of the vessel, and so manifestly operating obstructively—and partly, also, it is probable, from an increase of vital attraction between the blood and surrounding parenchyma—the circulation loses its acquired rapidity, and becomes slower even than in health. The red corpus-

cles are no longer limited to the central current, but are encroaching more and more on the lateral and clear 'lymph spaces.' Exudation is more copious than in the previous stage; it consists of serum and of liquor sanguinis, the latter usually predominating: and when the action has been for some time sustained, and as it were, established in the part, fibrin alone may be deposited." "The natural function of the part is not simply exalted, but begins to be perverted, for example, secretion is not only increased, but changed in its character." Nutrition is becoming more and more disturbed,—this is the commencement of diseased action. "This action may resolve after the removal of its simple exciting cause; or it may be sustained for some time, as in the healing of wounds, and the closing of ulcers; or it may advance to

"3. *True Inflammation*.—The change which, in the preceding stage, had begun in the blood, is now completed. The over-distension of the capillaries is established; the capillary power is for a time gone, perhaps in consequence of diminution or actual suspension of the nervous influence; and the coats of the capillaries and other vessels are thickened, softened, and impaired in cohesion, being themselves the subjects of structural change. The languor of circulation approaches stagnation, and at some points this has actually occurred; every part of the distended capillaries is occupied by crowded coloured and colourless corpuscles; partly, it may be, from increased attraction between the former and the surrounding parenchyma, partly by accumulation and adhesion of the latter to each other and to the capillary walls. The altered liquor sanguinis is exuded in profusion. The capillaries also give way in their coats, and from the lesion, blood is extravasated in mass. Suppuration is in progress by extravascular degeneration of the fibrinous effusion, or else by a secretive elaboration of it ere yet it has left the vessel. Breaking up and disintegration of texture ensue, according to the extent of extravasation and suppuration; and the disintegrated texture is commingled with the effusion. The formative power has ceased, and the opposite condition, a tendency to disintegration, from diminution of vitality, has become established. Disorder of function is complete; secretion, for example, being in the first place arrested, and when restored, more vitiated than before."

The *local symptoms* are redness, swelling, heat, pain, throbbing, increased sensibility, disorder of function, arrest and change of secretion.

Redness.—This is due to an afflux of blood to the part; the vessels become distended, and the capillaries convey red blood; the proportion of the red globules is also increased by the exudation of the serum. The *degree* varies in different tissues, and according to the intensity of the action; compare, for instance, an inflamed tendon

with an inflamed mucous membrane. The *tint* varies also between a bright scarlet and a deep purple. *Permanency* is characteristic of inflammatory redness. The redness of blushing is not indicative of inflammation, because it is momentary, and not conjoined with other symptoms.

Swelling.—This is occasioned by the increased quantity of blood, and an effusion of serum, pus, &c. The swelling of inflammation must be conjoined with other symptoms also, for in œdema there is swelling, but not inflammation. It must be *gradual* in its development: the sudden swelling produced by a hernia or dislocation is not that of inflammation. It must also be recent, not like the tedious growth of a genuine tumour. Swelling may be injurious, as in the brain or orbit of the eye; or it may be useful, as in a fracture, &c. It is most remarkable in loose textures; also in the breast, testicles, and lymphatic glands.

Heat.—This depends upon a more rapid oxidation of the tissues, which are also supplied with an increased quantity of blood. Heat of inflammation may be partly actual, as ascertained by the touch or the thermometer, and partly the result of a perverted nervous function, estimated only by the patient. It must be permanent, and conjoined with other symptoms to be characteristic, for in hectic there is burning of the hands and feet, yet no inflammation is there.

Pain.—Is caused partly by the pressure upon the nerves of the inflamed spot, and the distension of the arteries which are supplied by small nerves; and partly by disordered function. Mechanical pressure increases it, for instance, by the hand in peritonitis, or inspiration in pleurisy. Pain varies with the natural sensibility of the part affected, hence inflammation of the skin is more painful than that of cellular tissue. It is proportionate to the yielding nature of the structure affected; thus inflammation produces more pain in bones and ligaments, than in mucous membrane.

Pain is not always indicative of inflammation—for example, in spasm and neuralgia. In spasm the pain comes on suddenly, and is relieved by pressure; in neuralgia it is intermittent. Not so with inflammation—in the latter the pain gradually increases from the first; if it suddenly disappears suspicion is excited lest gangrene has supervened. Pain may be sympathetic, and referred to a part at a distance: in coxalgia, the pain is at the knee; in liver disease, in the shoulder; in disease of the kidney, at the orifice of the urethra. This is a point of practical importance in the application of remedies.

Increased sensibility.—This may be illustrated by intolerance of light when the eye is inflamed; the tenderness of the skin in erysipelas; the rejection of food by the stomach, and the constant urination if the bladder is the seat of inflammation.

Disorder of function.—The stomach cannot digest, nor the kidney secrete. If the brain or spinal cord be the seat, we may expect convulsions, or paralysis.

The *causes of inflammation* may be divided into *predisposing* and *exciting*.

Predisposing causes.—Include sanguine temperament, excitability; plethora, excess in food, drink, or exercise; debility, miasmata, bad air, food, and clothing; previous disease, &c. These may be considered as constitutional or idiopathic.

Exciting causes.—May be *direct*, such as the chemical effects of acids, salts, &c.; or mechanical effects of wounds, pressure, &c. *Indirect*, or vital, such as heat and cold, cantharides and turpentine. *Specific*, as in the instance of vaccine virus.

The *duration* and *character* of inflammation are modified by the nature, situation, and condition of the part affected, and the temperament and diathesis of the patient. Age, sex, habit, atmosphere, and season, all exercise an important influence in its progress and type.

RESULTS OF INFLAMMATION.

1. *Resolution.*—This is the most favourable result. It is the restoration of the part, as regards both structure and function, to its original and normal state. Effusion takes place, the vessels are relieved, the red globules move on, absorption takes place, and the usual symptoms subside: *Delitescence* is the *sudden* disappearance of inflammation; and when it is attended by the establishment of a new one, the term *metastasis* is used.

2. *Excessive deposit.*—Either of serum or fibrin, which has exuded through the coats of the vessels. When *serum* is effused into cellular tissue it constitutes *œdema*, which is characterized by *pitting* on pressure; when effused and collected in serous membranes, it constitutes *dropsy*. The effusion of fibrin requires a higher degree of inflammation, upon the subsidence of which new structures are formed by the organization of the fibrin, and parts are repaired; hence the term *plastic* is applied to it. Thus, wounds unite, bones knit, and arteries consolidate.

3. *Hæmorrhage.*—Occasioned by the destruction of the coats of the vessels. If it occur in the interior, it is termed *extravasation*. It is usually injurious, by producing pressure and exciting irritation, as, for instance, in the humours of the eye, or membranes of the brain.

4. *Suppuration.*—The formation of a fluid called pus. It is called *laudable* when it is yellow, creamy, and opaque; insoluble in water, but readily mixing with it. It has no odour, but a slightly sweetish taste. It is not corrosive, but bland and protective to tender granulations until covered by cuticle. When confined, it

produces disintegration of the textures in contact, by pressure. It is the result of a vital action. It consists of a fluid and globules. The fluid is the liquor sanguinis of blood effused; this separates into serum and fibrin; the fibrin becomes granular by the formation of exudation corpuscles, and these degenerate into pus-globules. When pus is thin and acrid it is termed *ichor*, consisting mostly of serum. In scrofulous persons it is flaky. When it contains blood it is called *sanies*. When it is of a leaden colour, thick, coagulated, and very offensive, it is *sordes*. Sometimes it is mixed with a subtle virus, as the venereal or vaccine; it is then said to be *specific*. When mixed in the mucous or serous discharges, it is termed sero-purulent or muco-purulent.

When suppuration is profuse and long continued, in a debilitated frame, it produces a fever called *hectic*, which is a constitutional irritation different from the inflammatory type. It is remittent, and attended with paleness of surface, except upon the cheeks. The appetite is good, but yet there is great emaciation. The tongue is clean, at first moist, but afterwards dry and glazed or aphthous. The bowels are constipated, or else attended with a diarrhœa, termed colliquative. The palms and soles burn, and there is great thirst. Respiration is rapid and short. The pulse is frequent and small. At noon there is increased fever preceded by a chill; at night there is perspiration, most profuse towards morning. The eyes are bright, though sunk in hollow orbits; and though there may be sleeplessness, lassitude, and debility, yet the mind is clear and the spirits are good.

5. *Ulceration*.—Hunter supposed that it was entirely the result of absorption. It is more properly a vital softening of a texture changed by inflammation and suppuration; becoming disintegrated and fluid, it passes away with the pus. The more violent the inflammation, the more rapid is the destruction; the term phagedenic is applied to those ulcerations in which the part is apparently eaten or consumed with unusual rapidity. Congestion is a predisposing cause of ulceration. The skin, mucous membranes, and cellular tissue, yield more rapidly in ulceration than the vascular, nervous, and fibrous tissues. Those of intemperate habits, and of scrofulous or syphilitic taint, are most liable to its ravages. The parts most likely to be affected are those whose circulation is weak and languid, such as the lower extremities, and parts newly formed, such as cicatrices, callus, and tumours.

6. *Mortification*.—This term includes the dying and death of a part from injury or disease. *Gangrene* denotes the process of dying, and is recognised by the following signs. Redness is changed into a livid hue; circulation is arrested, so is effusion, and there is less tension. Pain and heat abate, often suddenly. Putrescence commences, and there is an offensive smell. Phlyctenæ, or vesicles

filled with putrid serum, appear over the skin. *Sphacelus* is the completion of the gangrene. The part is cold and insensible; shrunken, soft, and flaccid; crepitates distinctly, owing to its containing gas, the result of putrescence; vital action has ceased, and the colour becomes black if the parts are exposed to the air. A *slough* is a small sphacelation. Nature makes an effort to throw off an injurious mass. The living part in contact with the dead inflames; and, in consequence, the abrupt livid line is bordered by a diffuse, red, and painful swelling—the *line of demarcation*; this vesicates, the vesicle bursts, puriform matter is discharged, and an inflamed and ulcerating surface is disclosed—the *line of separation*. The furrow deepens; skin and cellular tissue yielding first, the tendons and arteries resisting for some time. No hemorrhage occurs during gradual division of the parts; the arteries are sealed by the effusion of fibrin during the inflammation. But when the mortification is rapid, as in acute hospital gangrene, arteries are found playing in the dark and putrid mass alive, whilst all is dead around them. At length they yield, and death is hurried on by hæmorrhage.

The *constitutional symptoms* are of a typhoid form. The pulse is frequent and small, irregular or intermittent. The countenance is anxious, the face livid, the nose pinched, and the lips contracted.

Anxiety is soon changed into stupidity of expression, as if the patient were under the influence of opium or alcohol; sighing, hiccup, and involuntary movements of the hands and fingers are now observed, such as picking and fumbling with the bedclothes. Appetite fails; the tongue is coated with a brown fur, except at the tip and edges. The lips and mouth are dry and incrustated; swallowing is difficult. The mind is stupid, wavering, and subject to illusions; the articulation is thick and broken. Still more marked are the deathlike coldness, the clammy sweat, the small, indistinct, and flickering pulse, and the cadaverous expression. In this state a patient will sometimes lie for hours, and die without a struggle.

Mortification may be *acute* or *chronic*. The acute comprehends the humid, inflammatory, and traumatic. The chronic—the dry and idiopathic.

The *cause* of mortification is a *want of vital power*, and may be the result of high inflammation, mechanical injury, pressure, heat, obstruction to the return of venous blood, deprivation of nervous agency, interruption to arterial supply, as by aneurism or tourniquet, cold, general debility, bed-sores, improper food, spurred rye.

TREATMENT OF INFLAMMATION.

The first object is always to remove the cause, and afterwards to prevent or diminish the inflammatory action. The chief means are termed antiphlogistic, and consist of

General Bloodletting.—This is only required when the inflamma-

tion is severe, as in erysipelas and compound fractures, when important organs are involved, such as the lungs, bladder, kidney, eye, and peritoneum. If resorted to unnecessarily, it produces congestions, effusions, and atrophy. *Syncope*, or fainting, is produced when bleeding is pursued to a great extent. It is occasioned by the removal of the natural stimulus of the heart—the blood, and by the sedative influence transmitted from the brain, when deprived of its share of arterial blood. The benefit to be derived from bleeding is not merely the loss of superabundant blood, but also the sedative influence, whereby the emptied capillaries can resume their natural tone. A rapid full stream from a large orifice will soon produce syncope, if the patient be sitting or standing; whereas the system may be almost drained of blood by a slow stream from a small aperture, before faintness ensues, if the recumbent position is maintained. Bleeding is not to be regulated by its *amount*, but by its *effects*. As a general rule, the blood should flow until there is some paleness of the lips, sighing, nausea, fluttering of the pulse, or relief of pain. The ability to bear bleeding will vary according to age, sex, temperament, and disease. A man in health will faint usually from the loss of fifteen ounces; the same person, with a severe inflammation, particularly of the head, will bear double that amount. *Reaction* takes place after bleeding, the pulse rises, and pain increases, often to such an extent, as to require a second amount to be taken. A smaller quantity will now produce the same effects as a large one in the first instance. The operation is usually performed at the bend of the arm, in the neck, or in the anterior temporal artery.

Local Bleeding.—This is preferable when the inflammatory action is not high; when the powers of the system are low, when the inflammatory action on the part has been fully established, and there would be no benefit from a general bleeding, and when extreme age forbids it.

Cupping.—By this means blood is obtained more rapidly than by leeches, and we have the advantage of general bleeding combined with local abstraction.

Leeching.—Leeches can be applied where cups cannot. In order to apply them, the part should be first washed, and if they will not stick, a little cream or blood should be smeared on it. Their appetite is increased by being dry. If slow to bite, immersion in warm porter will be useful. Their bites are sometimes troublesome from hæmorrhage. This is arrested by the mur. tinct. ferri, or a fine point of nitrate of silver. American leeches will draw a 5 or 5iss of blood; foreign leeches take an 3 or 3iss. Salt will occasion them to drop off.

Purgatives.—They deplete, by causing an increase of mucous exhalation from the bowels. They also act as derivant, prevent assimilation of nutrition, and promote absorption; they are particu-

larly useful in diseases of the head, but are contra-indicated in bad fractures, and inflammatory affections of the bowels.

Emetics, diaphoretics, and diuretics are useful at the outset, emptying the stomach, and promoting perspiration, particularly the tart. ant. et potassæ.

Mercury.—Not only as a purge, but gradually introduced into the system, it seems to exert a tonic effect on both the extreme blood-vessels and the lymphatics; that is, in the absorbents, thus preventing or limiting impending effusion, and at the same time expediting the removal of that which had already been exuded.

Opium.—Particularly useful when combined with calomel, and given after bleeding. Before bleeding it arrests secretion, and stimulates,—afterwards it soothes the nervous system, relieves pain, and prevents reaction.

A strict *diet* must be maintained, and the drink should be refrigerant; at the same time both body and mind should be at rest, and there should be a good supply of fresh air.

Local Remedies.—Complete *rest* of the inflamed part. Elevated *position*, so as to favour the return of blood. *Cold applications*, ice-water, solution of sugar of lead, and muriate of ammonia—especially in the early stages; for in high inflammations *warmth and moisture* are very grateful to some persons—relaxing tension, and assuaging pain. *Nitrate of silver* has great antiphlogistic powers, as well as caustic properties, especially when applied to the skin and mucous membranes. Iodine also exerts a somewhat similar influence.

Counter-irritation.—By means of dry cupping, blisters, setons, issues, caustic, and actual cautery.

ABSCCESS.

An abscess is a collection of pus in a natural or preternatural cavity, and may be either acute or chronic.

ACUTE ABSCESS.

Is frequently called *phlegmon*, when occurring in the subcutaneous cellular tissue. Commencing with all the symptoms of inflammation,—fever, pain, redness, and swelling. The centre is firm, with œdema surrounding it. The formation of pus is indicated by rigors, an abatement of the fever, and a feeling of weight, tension, and throbbing. The centre softens, which is termed *pointing*, and *fluctuation* can be felt. There is a natural tendency to the discharge of pus, which is more apt to be towards the skin. It is less apt to open into serous than into mucous membranes. The matter having been discharged, the pyogenic membrane lining the cavity becomes covered with numerous small, red, vascular eminences, called *granulations*. They are formed by the organization of lymph.

The cavity contracts and fills up with granulations. A white pellicle extends from the circumference, gradually covers the whole surface, and becomes organized into a new cutis and cuticle, called a *cicatrix*. At first the cicatrix is thin, red, and less vascular; it afterwards contracts and becomes paler.

The causes of abscess are mostly idiopathic; it occurs frequently after fevers; it may, however, be caused by blows, foreign bodies, &c.

Treatment.—The indications are, in the first stage to produce resolution, and prevent the formation of matter. After it has formed, the indications are to cause its evacuation, and induce granulation and cicatrization. There should be cold applications, and leeches applied to the part, purging, and low diet. When matter is formed, the applications should be warm fomentations and poultices. Poultices may be made of bread, Indian meal, or ground flaxseed softened with water; they should be large and light, and renewed frequently; they relax the skin, promote perspiration, soothe the pain, encourage the formation of pus, and hasten its progress to the surface. Lint soaked in warm water may answer for a substitute.

Abscesses need not be *opened* if they point, and are pyramidal, and do not enlarge in circumference, but may be allowed to burst themselves. But they should be opened when they are beneath tendons, fascia, or the thick cuticle; when caused by the infiltration of urine; when in loose cellular tissue, with a tendency to burrow; when near a joint, or under the deep fascia of the neck,—where it is desirable to obviate the scar made by the abscess opening spontaneously. The best instrument for the purpose is a straight-pointed, double-edged bistoury, by which the opening can be enlarged to any extent. The matter should not be forcibly squeezed out, but allowed to exude gradually into a poultice. By introducing a tent the edges are prevented from uniting.

Abscesses are sometimes absorbed, especially those in glandular structures and venereal cases. This can be promoted by leeches, mercurial ointment, and remedies adapted to increase the general health.

CHRONIC ABSCESS.

Is the result of a low degree of inflammation, and is often unsuspected. It is lined by a cyst, and the pus is serous or curdy. Sometimes the matter is concrete. Is most apt to occur in weak and scrofulous habits, and is usually free from pain, redness, swelling, &c. It may, however, become exceedingly large, and from distension, inflame, ulcerate, and discharge.

Treatment.—Improve the general health, and promote absorption by means of mercurial plasters, blisters, and iodine frictions. If it cannot be absorbed, it must be opened with care; a small, superficial abscess should be opened freely at once, the cavity injected

with a stimulating solution, and pressure applied by means of compress and bandage. If the matter is not freely evacuated, great injury results from the effect of air on the contained pus; putrefying, the product—hydrosulphate of ammonia is absorbed, and the patient becomes typhoid. When the abscess is large, the opening should be small and valvular, so as to prevent the introduction of air; or, the opening may be healed after a portion of the matter has escaped, and another made ten days afterwards; or, the part may be kept constantly immersed in water.

ULCERS.

Ulcers are breaches of continuity of surface, the destruction being caused by disease or unrepaired injury. The following classification will be found to include the great majority of ulcers.

SIMPLE OR HEALTHY ULCER.

In this we have an exemplification of granulation and cicatrization. The surface is covered with a thick, creamy, yellow pus, not too profuse, and inodorous. The granulations are small, pointed, florid, sensitive, and vascular. When they reach the level of the skin, cicatrization commences. The edge swells a little, and then is covered with a white pellicle of lymph, which is converted into cuticle.

Treatment.—The plan of the treatment is simply protective. Pus is the natural protection to these granulations; if, however, it collects, it becomes a source of injury, increasing ulceration. The air acts as a stimulus, and may cause too great inflammation. Hence the propriety of dressing. It should be lint dipped in tepid water or some simple cerate; water dressings are now preferred. The dressing should only be removed for the sake of cleanliness and removing the fluid pus; but care should be taken not to wash the surface too freely, else the progress of cicatrization is delayed by the removal of lymph which may be mistaken for pus.

WEAK ULCER.

If the granulations are too luxuriant, becoming pale and flabby and long, they should be treated by an astringent wash, such as a solution of sulphate of zinc or copper; or they may require an escharotic, such as solid sulphate of copper or nitrate of silver; or a scab may be formed by exposure to the air, or spreading fine lint upon the surface; at the same time a generous diet will be beneficial.

SCROFULOUS ULCERS.

These occur in debilitated constitutions, and usually in clusters; most frequently upon the neck and joints. They originate in the cellular tissue, beneath the skin. At first, there is hardening, with-

out pain, then swelling, followed by imperfect and slow suppuration; the skin becomes blue and thin, and the aperture for the discharge has ragged edges, revealing a dirty gray surface, with no granulations; the integument is soon undermined, and the ulcers communicate. The pain is slight, and the discharge is thin and serous. The system sympathizes and the result may be hectic.

Treatment.—Constitutional remedies should be steadily persevered in. Active measures must be taken to get rid of the soft infiltrated tissue surrounding, by escharotics; caustic potash must first be freely applied, and then a poultice; upon its removal a slough will be found to have separated, and the surface to be firm and vascular, covered with healthy granulations. The sore may then be treated as a healthy one, unless a relapse occur, when the application should be repeated. The constitution must be sustained, and the cicatrix supported by a bandage; otherwise it may ulcerate, especially if it is blue, soft, spongy, and elevated.

INDOLENT ULCER.

This is the most common of all ulcers, and occurs most frequently in the lower extremity and in old persons. It is owing frequently to a healthy sore having been neglected or badly treated. Its surface is smooth, glassy, concave, and pale. The discharge is thin and serous. Its margin is elevated, round, white, and callous, resembling a cartilaginous ring surrounding a mucous membrane. The surrounding integument is swollen, hard, and of a dusky red colour.

It has little sensibility, and the patient is apt to let it go unnoticed, unless by accident, exposure, or over-exertion, it inflames and becomes painful.

Treatment.—At first a poultice will be serviceable by cleansing the sore and diminishing the inflammation and pain which usually precede the application for relief, which a purge and rest will assist in producing. The surface should be lightly touched with nitrate of silver or nitric acid, in order that healthy granulations should sprout; or, pressure may be employed to produce the same effect by means of strips of adhesive plaster and bandages. Small doses of opium are also useful in maintaining the capillary circulation.

IRRITABLE ULCER.

This has been defined as possessing an excess of organizing action, with a deficiency of organizable material. It is superficial, having an unequal surface of a dark hue, and often covered with tenacious fibrin. It occurs most frequently near the ankle. The edges are thin, serrated, and everted. The discharge is thin, acrid, and bloody. It is very sensitive, attended with great pain, and produces often peevishness of disposition.

Treatment.—Rest, elevation, and relaxation of the part. Nitrate

of silver produces a sedative and antiphlogistic effect. This should be followed by a light poultice, or warm-water dressing, or, if there is great pain, fomentations of the infusion of opium, conium, or belladonna.

PHAGEDENIC ULCER.

This is of an irregular form, with ragged, abrupt edges, and uneven brown surface, looking as if gnawed by the teeth of an animal. It is attended with burning pain, and great constitutional disturbance.

It frequently assumes a sloughing form, as in hospital gangrene and cancrum oris, when the discharge is extremely foetid.

Treatment.—Should be both constitutional and local. Fresh air and good diet are all-important; the secretions must be corrected and a Dover's powder given at night. Locally, there should be applied active escharotics, such as nitric acid, nitrate of mercury, &c., followed by warm poultices; these may be superseded by warm solutions of the chloride of lime or soda. Mercury must never be given, especially in cases of a venereal taint.

VARICOSE ULCER.

This is dependent upon a varicose condition of the veins, and usually occurs in the leg, just above the ankle. They are oval and superficial, and attended with deep-seated, aching pain. They are indolent, and usually moist upon the surface.

Treatment.—The cure must depend upon removing the disease of the veins. Great relief will be found in the constant use of cold water, rest, regular bandaging, or laced stockings.

Certain ulcers are not to be healed, for example, when an ulcer has been stationary for years, when the patient is old, gouty, or a high liver; it may be looked upon as a safety valve, and any tendency to unite as indicative of impaired health. The sudden cessation of a drain of pus might be followed by hemorrhage, apoplexy, or inflammation of some important organ.

ERYSIPELAS.

Erysipelas is an inflammation of the skin and subcutaneous cellular tissue, having a tendency to spread.

The *cutaneous* form is characterized by redness, elevation, and burning pain; compression produces pale dimples, which soon disappear, and the cuticle vesicates. It usually terminates in a week or two, but may return to some other part.

The *phlegmonous* or *cellulo-cutaneous* form is more severe. The swelling is greater, the colour darker, and the pain more severe. Thin, ichorous pus is formed, which infiltrates the cellular tissue, and thus ulcerations and sloughs follow. The constitution sym-

thizes ; at first the fever is high, then there are signs of hectic, and at last prostration and collapse.

When it affects the head or throat, producing coma or dyspnœa, and when it occurs in feeble, old, or intemperate persons, there is great danger.

The *causes* may be fatigue, foul air, intemperance, epidemic influence, contagion, and injuries.

Treatment.—This must be adapted to the *age* and *constitution* of the patient ; the young and plethoric will require most active antiphlogistic treatment constitutionally, whilst the old and broken down will need stimulants and tonics. In most instances, bleeding will be useful, followed by saline purgatives and diaphoretics. In highly inflammatory cases, an emetic administered early will also prove serviceable.

Bark will be necessary in the latter stages, if there is debility ; opium will allay the restlessness at night.

The *local measures* most useful are leeches, punctures, cold lotions, if the pulse is good ; and mercurial ointment, or nitrate of silver applied to the surface. Extension of the disease may be prevented by strips of blistering plaster, encircling the part.

Deep incisions are to be made in case there is pus collected under the skin.

Chronic, or habitual erysipelas, is best treated by alteratives and aperients.

FURUNCULUS, OR BOIL.

Boils occur most frequently in the young, and in those of plethoric habit, and in those parts where the skin is the thickest. They are usually gregarious, and depend upon derangement of the primæ viæ, and frequently succeed eruptive diseases.

The swelling is of a conical shape, having a hard, red, and painful base, and a yellow apex. If left to itself it bursts and discharges pus, and a core or slough of cellular tissue. When completely emptied the heat and pain subside.

Treatment.—Poultices and warm fomentations should be applied early ; as soon as pus has formed a free incision must be made ; and the granulating wound dressed in the ordinary way.

ANTHRAX, OR CARBUNCLE.

This is a serious disease ; it is a solitary inflammation of the cellular tissue and skin, presenting a flat spongy swelling of a livid hue, and attended with dull burning pain. It varies in size, and its progress is slow.

The constitutional symptoms are asthenic throughout, and the attendant fever is apt to become typhoid ; prostration and delirium

often terminate the case. It most frequently attacks high livers of an advanced age.

Treatment.—A free and early incision will evacuate sanious pus and fetid sloughs; this is to be followed by applications of caustic potash, in order that the dying parts may be thoroughly removed. Poultices and warm fomentations will clean the surface, and give rise to healthy granulations. Tonics and stimuli, such as bark, brandy, ammonia, are early required, particularly if the carbuncle is large, and system debilitated.

PERNIO, OR CHILBLAINS.

This is an affection of the skin, produced by sudden alternations of cold and heat, most commonly affecting the toes, heels, ears, or fingers. It is attended with itching, swelling, pain, and slight redness at first; it may afterwards become of a livid hue, with vesications and ulcerated fissures, which are difficult to heal.

Treatment.—There is a great variety of applications in domestic use for this disease, and some of them of the most opposite character. The most serviceable remedy under all circumstances, but particularly when there is ulceration, is the nitrate of silver. Temporary and soothing relief is produced by cold applications.

FROST BITE.

Severe exposure, combined with exhaustion and fatigue, irresistably induces sleepiness, which, if yielded to, is followed by coma and death. When a part of the body is frost-bitten it becomes contracted, pale, and insensible. It may take place without the consciousness of the patient; without care it terminates in gangrene.

Treatment.—Produce *moderate reaction*, which will restore circulation and sensibility, taking care that it be *not excessive*, which would lead to dangerous inflammation. First rub the part with snow, and then with cold water in a room without fire. For the comatose condition of the body produced by cold, also use friction with snow, in a cold room, afterwards substituting flax or flannel; gradually giving warm and stimulating drink, such as wine and water.

BURNS AND SCALDS.

There are three principal divisions of these injuries, which may be produced by hot fluids, vapour, flame, or solids.

1st. Those which produce mere redness and slight inflammation, terminating in resolution, and perhaps desquamation.

2d. Those causing vesications of the cuticle, which often dry up

and heal; but if the cutis has been injured and inflamed, suppuration and ulceration result.

3d. Those causing the death of the part, in which there is not much pain, and which are followed by sloughs.

Extensive burns, even if superficial, are very dangerous; and those upon the trunk are more fatal than those of the extremities. The symptoms are paleness and shivering, with a feeble, quick pulse; often prostration, coma, and death. The greatest danger is during the first four or five days, from collapse; subsequently from an affection of head, chest, or abdomen, or from prostration.

Treatment.—Bathing the part in cold water will mitigate the heat, pain, and inflammation; afterwards it must be protected from the air by cotton, or some bland unctuous substance, care being taken to discharge the vesicles without removing the cuticle. Calm the nervous excitement with opium, and prevent sinking with wine and ammonia. Be careful of over stimulation, and promote the separation of sloughs by rest, poultices, and fomentations. Regulate the diet, and encourage granulations by water-dressings, saturated with salts of copper, zinc, or silver, or with chloride of lime. Contraction of cicatrices is to be prevented by mechanical means, and the function of joints is to be retained by passive motion.

WOUNDS.

Wounds are classified into incised, contused, lacerated, punctured, poisoned, and gunshot.

INCISED.

These are produced by sharp-edged instruments, and bleed freely. They heal in various ways; *by adhesion*, or *union by the first intention*, in which there is no suppuration. Fibrin is thrown out, and coagulating, becomes organized, and constitutes a new living structure; incorporated with the cut surfaces, it restores the solution of continuity in the solid parts.

Wounds heal by *growth*, whereby reparation is made, without inflammation and suppuration, as in ordinary nutrition.

Wounds heal by the *modelling process*, which is somewhat similar to the last, the gap gradually filling up with lymph, and restoring the deficiency.

Wounds heal by *granulation*, constituting union by the *second intention*, a process formerly described in treating of abscess.

Treatment.—This consists in arresting hemorrhage, removing foreign bodies, bringing the edges together, and promoting adhesion.

Hemorrhage is arrested by cold applications, elevated position, and compression, or, if an artery has been cut, by a ligature, or by torsion.

Ligatures are usually made of silk or thread, and should be round or twisted, in order to divide the internal and middle coats of the artery. Animal ligatures are sometimes used on account of their speedy decomposition, and separation from the artery; ligatures of lead have also been used.

Compression can be effected by the tourniquet, bandages, and pledgets of lint; in lieu of a tourniquet a Spanish windlass may be used, which is made by tying a handkerchief around a limb, and twisting it tightly with a stick.

Styptics are also used where the vessels are small, and the *actual cautery* when the hemorrhage cannot be arrested by other means. Foreign bodies, such as pieces of glass, clots of blood, &c., &c., are to be removed from the wound, and the lips brought together by means of adhesive plaster applied to surfaces cleanly shaved, and free from moisture.

Sutures, or stitches, are to be used only when the edges cannot be approximated by other means. An *interrupted suture* is made by passing a needle, armed with a single ligature, through both lips of the wound, which are then to be drawn together without any great straining, and secured by a double knot. These stitches are to be made at intervals of about an inch, but should not be made in any tendinous structure, or highly inflamed part.

A *twisted suture* is made by transfixing the margins of the wound with a needle or pin, and passing around it a waxed ligature in the form of the figure 8, by which means the edges are brought in contact; the point of the pin, or needle, is to be protected with wax, and allowed to remain for several days.

The *continued*, or *glover's suture*, is nothing more than the ordinary mode of sewing cloth or leather.

CONTUSED AND LACERATED.

These resemble each other; are attended with little hemorrhage, because the arteries are torn, and do not bleed so much as when cut. They are dangerous, because they are liable to inflammation and sloughing, and are often complicated with foreign bodies; and they are more apt to produce constitutional disturbance and tetanus.

Treatment.—Adhesion is impossible; suppuration must take place, and the dead parts be thrown off; the reparation takes place by granulation. At first it will be necessary to arrest hemorrhage, remove foreign bodies, bring the parts in apposition by strips of adhesive plaster, and apply water-dressings, or a light poultice, according to the condition of the patient. Cold and other antiphlogistic means, such as bleeding and purging, must be used cautiously when there has been a great shock upon the system, otherwise the vitality of the parts will be depressed, and the risk of gangrene increased; but after fever and suppuration are established, the

usual means of combating inflammation may be employed. When the sloughs are numerous, and the discharge profuse, typhoid symptoms will appear, especially if the patient be much reduced by depletion and rigid diet.

PUNCTURED AND PENETRATING.

These are inflicted by sharp-pointed instruments, and are extremely dangerous, on account of the injury done to important parts, by opening vessels and cavities, and from the diffusion of purulent secretions, and the liability of tetanus.

Treatment.—After ascertaining that the wound contains no foreign matter, apposition is effected, and maintained by position, rest, and dressings, and the system placed under antiphlogistic regimen; adhesion is to be expected, or reparation by granulation. There may be severe secondary symptoms arising from secondary hemorrhage, or confined purulent secretions; it may be necessary to apply a ligature upon the artery above the ulcerated wound; or, to open and dilate it for the exit of pus, or a foreign body before undiscovered.

POISONED.

These include bites and stings of animals, and the effects of dissecting wounds.

The stings of ordinary insects are not sufficiently severe to require surgical aid, unless in great number, and in peculiar situations. Children sometimes suffer with fever and headache, when stung in a number of places; and the suffocation produced by a sting in the pharynx is alarming.

Treatment.—For the common sting of a wasp or bee, remove the sting of the animal with forceps, should it remain, and apply some stimulating application, such as turpentine, cologne water, or harts-horn. Hartshorn will probably give most relief, especially combined with cold applications. If there is faintness or depression, administer wine and opium. If the sting is in the fauces, use leeches internally and externally, stimulating gargles, and, if necessary, open the trachea.

Spiders, especially the tarantula, *scorpions*, and *serpents*, inflict a most severe injury. The bite of the *viper*, *cobra de capello*, and *rattlesnake*, is attended with great pain, swelling, constitutional disturbance, and death. In such wounds great caution must be used to extract the poison from the wound, and to prevent its passing into the circulation. Surrounding the limb with a ligature, bathing the wound with warm water, and sucking it, are all of use; but the application of cupping glasses, and scarifications, is the most certain method.

The prostration of the system is to be treated with brandy and

ammonia, and the pain to be relieved by opium. Various remedies are given internally, such as sweet oil and ammonia, but arsenic has a most decided preference; the celebrated Tanjore pills each contain a grain; the proper dose is fʒj to fʒij of Fowler's solution.

HYDROPHOBIA.—Hydrophobia is a disease brought on by inoculation with the saliva of a rabid animal, and characterized by intermitting spasms of the muscles of respiration, together with a peculiar irritability of the body and disturbance of the mind.

The first symptoms in the dog are shyness, want of appetite, drooping of his tail and ears, a suspicious, haggard look, red and watery eyes, constant snapping at and swallowing straws, and licking cold surfaces, such as stone and iron; afterwards respiration becomes difficult, viscid saliva flows rapidly, and there is inflammation of the fauces, and high fever. He is not always furious, nor does he always bite, unless irritated; his gait is staggering, and he dies in convulsions, usually after the fifth day.

The symptoms in man vary with constitution and habit, and usually appear between five and ten weeks subsequent to the bite.

The wound heals as usual; after a time there is pain and itching in the cicatrix, which gradually increases, and ulceration follows. There is headache, restlessness, fever, and excitement of the nervous system. The mind is particularly clear and active; the memory strong, the imagination vivid, the countenance animated, and the eyes sparkling. This is succeeded by despondency, and the dread of fluids, great agitation, spasms, difficulty of breathing. Every attempt to relieve the burning thirst is followed by convulsive contractions of the neck and throat; sleepless despair, change of voice, croupy inspiration, and involuntary biting are the next symptoms. As the disease advances, the brain becomes more affected, and death is preceded by delirium.

Treatment.—The recent wound should be treated by cupping-glasses and nitrate of silver. In not more than one case out of twenty does hydrophobia follow the bite of a rabid animal. The bite is much less dangerous when through the clothes. After the disease is established, nothing can be done with the prospect of cure; although every remedy and mode of treatment has been recommended. Palliatives and medicines which calm the nervous system and relieve pain may give some temporary relief.

DISSECTING WOUNDS.—These are followed by unpleasant results more frequently in those of a scrofulous temperament, or in those whose systems are exhausted by study or dissipation.

The consequences may be a simple pustule, inflammation of the lymphatics, and typhoid fever, with diffuse abscesses.

The *pustule* has not much elevation, is surrounded by redness, and attended with burning and itching. When opened it discharges a little, thin pus, and is soon refilled, the excavation gradually in-

creasing. This may not be followed by constitutional symptoms, unless the health is very bad.

The inflammation of the lymphatics is more apt to follow a small scratch or wound from examining recent subjects, especially those dying with peritonitis or any disease of serous membranes. The pain and swelling extend up the arm to the axilla, and there is fever and depression of spirits. The course of the inflammation can be traced along the lymphatics to the axillary glands, which often suppurate.

Extensive abscesses and typhoid fever take place when the poison is very violent and the system much prostrated.

Treatment.—The pustule will be managed best by a lye poultice, and then removing the coverings and touching the surface with lunar caustic. A simple incision or puncture for an ordinary pustule will not prevent the renewal of the matter.

When the lymphatics are inflamed, the original wound is not always the most tender spot, nor is there the appearance of a pustule. Leeches, cold applications, poultices of Indian meal and rye, nitrate of silver, and tincture of iodine are useful local applications. Bleeding may be necessary when the inflammation and fever are very high. Free incisions prevent the formation of abscesses, by evacuating the serum and depleting the part. Spreading abscess of the cellular tissue is attended with typhoid fever, and very dangerous. The system must be supported by stimulants and tonics, such as brandy and bark; opium will allay pain and restlessness, and the local dressing will resemble that for abscess in general.

Fresh air, clean clothes, healthy skin, good diet, and regular habits will be found to be the best prophylactics.

GUNSHOT WOUNDS.

These include all injuries by fire-arms, and partake of the nature of lacerated and contused wounds. There is usually but little hemorrhage, unless a large vessel is injured. The nature and extent of the injury will vary with the distance, force, and character of the shot or slug producing it, and the part affected; fracture, contusions, and perforations may require amputation. The aperture made by the entrance of the bullet often appears smaller than the bullet, and resembles an incised wound with inverted edges; the aperture of its exit is larger, and has ragged and everted edges. The pain of a flesh wound is often so slight that it does not attract attention; but when a bone is broken or a nerve torn, the pain is severe. The shock upon the system is greater than in other wounds, and is partly corporeal and partly mental. Syncope and depression of spirits are very common attendants.

The idea of injury resulting from the *wind of a ball* is erroneous.

Injuries may result from spent balls, which, having a rotary motion, may roll over the surface without producing an open wound.

The course of bullets is uncertain; any obstacle, such as a button, a watch, or a bone, may occasion a most devious track. A ball may strike the forehead, and emerge at the occiput, or, striking the sternum, lodge in the scrotum. A bullet may be divided into two parts by striking a sharp edge of bone; or it may bury itself, and remain concealed for years, being enclosed in a cyst.

When there is but one aperture, it is probable that the ball has lodged; though it may have escaped upon the removal of the clothing, if a portion of the clothing should have been carried before it into the wound; or, the ball may make a complete circuit, and escape by the aperture of entrance; in this instance the track would be discovered by redness and swelling. When two orifices are in a straight line, it is not always to be inferred that the ball has escaped, for two balls may have entered opposite each other; the character of the orifices will determine this point. A plurality of openings does not always imply a plurality of balls; the same bullet may perforate and escape, and perforate again.

The wound partially sloughs and may produce abscess, erysipelas, hemorrhage, disease of the bones, hectic, or tetanus.

Treatment—The general indications are to overcome the shock, remove foreign matters, adjust the parts, and place them in a comfortable and relaxed position.

A simple wound, made by a ball passing through some fleshy part should at first be sponged clean, and after hemorrhage has ceased, dressed with dry lint, secured by strips of plaster. A little wine and laudanum may be given if the patient is disposed to faint, or suffers much with anxiety and fear. In a few days there is inflammation and suppuration. The primary dressings are to be removed with warm water, and a poultice or the water dressing substituted. Care must be taken that the sloughs are readily thrown off, and that no sinuses are formed. The constitutional treatment should be moderately antiphlogistic; consisting of purging, low diet, leeches, and perhaps bleeding; an opiate at bedtime will allay pain and twitching.

The presence of bullets and other foreign bodies can be detected by a probe, and they are to be removed by a forceps, the wound having been dilated, if necessary. If they are superficially lodged, they are to be cut down upon, extracted by a counter opening; if they are deep-seated and impacted, wait for the suppurative stage. When lodged in bone, they may be removed by a chisel or trephine, lest they produce caries or necrosis, although in many instances they have become encased and occasioned no inconvenience.

The question of amputation will be settled by considering the liability of gangrene, the usefulness of the limb if retained, the age,

habits, and strength of the patient, and the means at hand for carrying out the treatment. The latter consideration will justify more numerous amputations in military and naval than in civil surgery. The following circumstances make amputation necessary.

When a limb is completely knocked off by a cannon-ball. If the bone is shattered and the joint endangered, it should be amputated above the joint.

When the femur is fractured, and the femoral artery or vein, or the sciatic nerve is lacerated.

When large joints are injured; but that of the elbow may often be excised.

When the main artery is wounded, and gangrene has commenced and is spreading.

TETANUS.

Is a disease of the true spinal system, and is manifested by spasm and rigidity of voluntary muscles.

When the muscles of the neck and face are affected, it is termed *Trismus*, or locked jaw; when the muscles of the front, *Emprostotonos*; when the muscles of the back, *Opisthotonos*; bending to either side is termed *Pleurothotonos*.

Tetanus may be either an *acute* or *chronic* disease; the former is the most frequent in occurrence, and most formidable to treat; the latter, apt to be partial, milder, and more subject to treatment.

Traumatic tetanus follows a wound or injury, and is usually acute; *idiopathic* tetanus is of spontaneous origin, and usually chronic.

Acute traumatic tetanus is more frequent in hot climates, and in military practice, and may follow a slight bruise or puncture, especially if some nerve has been injured. Intestinal irritation and atmospheric changes predispose to the disease.

The symptoms may appear in a few hours, or in as many days; at first there is stiffness and soreness about the neck and face, the contraction of the muscles causing a ghastly smile; swallowing and mastication are difficult, the forehead is wrinkled, eyeballs are distorted, nostrils dilated, and the grinning countenance is expressive of horror. Respiration is rapid, the tongue protrudes, and saliva dribbles; the sphincters are usually contracted, perspiration is profuse and of a peculiar odour; the pulse at first may be strong and full, but soon becomes weak and indistinct. The mind is clear until just before death, which generally takes place in a few days.

Treatment.—The indications are to remove all sources of irritation, and diminish the spasm. The wound is to be cleansed from all foreign bodies, pus to be discharged by a free incision, if necessary, and warm anodyne poultices and fomentations are to be applied. Excision of the wound, or division of the nerve leading to it, has

been practised with great benefit. Bleeding should be employed with great care, and purgatives combined with mercury are always of advantage. Opium is almost indispensable, and may be used externally and internally. Camphor, musk, assafoetida, and tobacco are also of use as antispasmodics.

Chronic tetanus is seldom fatal, and frequently idiopathic; it lasts several weeks, and should be treated by the shower-bath, tonics, and electricity. Ether or chloroform may be used with advantage.

DISEASES OF BONES.

CARIES.

Caries is an unhealthy inflammation of the bone, attended with softening, and leading to suppuration and ulceration. The bone has its cells filled with serous, and often with scrofulous fluids, and when dried has a spongy and worm-eaten appearance, and resembles a lump of sugar after being dipped in hot water. The disease most frequently attacks the thick bones, and the extremities of long bones; and it may result from local injury, or simply from constitutional causes, such as scrofula, or effects of mercury. It is attended with pain and swelling, and after ulceration there is a foetid discharge containing portions of bone.

Treatment.—The constitutional treatment consists of fresh air, tonics, and alteratives; and the local treatment in removing those portions incapable of repair, and endeavouring to establish healthy granulations. Sometimes it may be necessary to remove loose portions of bone which are disintegrated, and to apply escharotics to the surface.

CARIES OF THE SPINE.

This occurs most frequently in children, and in persons of a scrofulous temperament. At first there is a sensation of numbness in the lower extremities, languor, and a stumbling gait. The patient usually sits with his legs drawn up under the chair, has a constriction of the chest, and derangement of the digestive organs; in a short time paralysis ensues, and there may be a pointing of matter at some portion of the spinal column, most frequently about the dorsal vertebræ. The bodies of the vertebræ are softened and compressed, and thus a curvature takes place; the convexity of which is most frequently directed posteriorly. Many die from fever and irritation, and recovery is usually attended with deformity.

Treatment.—Absolute rest upon a mattress, attention to the general health, counter-irritations over the tender point, by means of blisters and issues, and in the early stages, leeching. The diet

should be light and nutritious, and a laxative administered occasionally.

NECROSIS.

This signifies the death of the bone, which is often enclosed in a case of new bone. When a superficial layer is affected it exfoliates; the dead portions thrown off are termed *sequestra*. It occurs at all ages, and most frequently in the compact bones; the immediate cause, is inflammation of the periosteum. It is attended with swelling, and a discharge of matter through openings in the case of new bone, which are termed *cloacæ*. The pain is deep-seated, long-continued, and very severe.

Treatment.—This is principally local, although constitutional remedies may be given to allay pain. The great object is to facilitate the escape of pus and the sequestra; it is often necessary to enlarge the cloacæ by a saw or trephine, and to dilate the sinuses with lint. Amputation may be necessary in case the joints are involved.

EXOSTOSIS.

This is a tumour formed by an excessive and irregular growth of bone. The shape varies, being sometimes broad, and sometimes spiculated. The structure is healthy, and it may cause no inconvenience, unless it interferes with an artery, muscle, or joint.

Treatment.—The object is to produce absorption, by means of mercury, iodine, blisters and leeches; but since these usually fail, it is necessary to resort to an operation. This may be performed by a saw or trephine. Scraping off the periosteum is also recommended.

FRAGILITAS OSSIUM.

This is a brittleness of bones, occurring frequently in youth, but oftener in old age. The proportion of earthy matter is relatively but not actually increased. The cancellated structure is filled by an oily substance, and surrounded by a thin, brittle lamella. This degeneration follows long confinement, intemperate habits, and rheumatic and cancerous affections. A hasty step, turning in bed, or tripping on a carpet, may produce fracture.

Treatment.—In old persons all that can be done is to guard against any accident, and to enjoin a nutritious diet and salubrious atmosphere. In children, care should be taken to overcome a scrofulous constitution by tonics and good diet, and to treat the fracture as usual.

MOLLITIES OSSIUM.

This is a deficiency of the earthy matter of bones, and hence

they are soft and pliable. This disease occurs in adults, and its course is rapid; the general health is impaired; flesh, spirits, and strength, diminish daily. The bones are light, soft and greasy, and often consist of an external shell, filled with a soft, greasy matter. The cause is obscure; phosphatic deposits are found in the secretions.

Treatment.—This is merely palliative, for the disease is incurable.

RICKETS.

This is an original defect of the skeleton, peculiar to youth and scrofulous temperaments. The bone is changed in its structure, becoming soft and pliable, as in mollities ossium. The cancellated structure predominates, the cells being filled with a reddish oily fluid. The flat bones are often thickened, and the long bones atrophied in the shaft. This disease gradually increases with age, and hence great deformity, and curvatures of limbs must necessarily occur. In adult life, the general health may be regained, and the patient, though a confirmed and unseemly dwarf, weak and puny in his boyhood, may prove a healthy, muscular, and active man.

Treatment.—Improvement of the general system by diet, exercise, proper clothing, and tonics. Mechanical apparatus, properly constructed, may be of service in preventing permanent deformity. Those articles of diet which are readily converted into lactic acid, such as sugar, starch, gum, milk, &c.; should be avoided, and animal food of easy digestion preferred.

SPINA VENTOSA.

This is a swelling, usually of considerable extent, involving the whole circumference of the bone, and has a regular surface. In most instances, it is a bony shell, containing one or several cavities, filled with an ichorous fluid, clotted blood, and portions of carious bone. It is preceded by severe pain, and external injuries and constitutional causes may give rise to it. It is difficult to cure, especially in adults.

Treatment.—When the tumour is small, the cure is to be effected by means of puncture, satisfactory evacuation, external support, and internal stimulation of the cavity. If the tumour is large, and the general health affected, amputation will be necessary.

OSTEO-SARCOMA.

This is a tumour, composed partly of bone and partly of flesh, and is usually considered of a malignant nature. A *dissection* of the tumour presents a dense, pearl-coloured membrane, covering the surface, and adhering closely to the bone; above this membrane the muscles are thin and spread out, so as to cover an extensive surface,

having lost their colour. Upon opening the tumour, it will be found to contain cells divided by spiculæ of bone, and materials resembling flesh, jelly, and fat. It is attended with deep-seated pain, and at last bursts, assuming a cancer-like ulceration.

Treatment.—At first, leeches, cold applications, and anodynes, may give temporary relief, but no permanent benefit can be expected without its removal; and even after amputation, it frequently attacks the stump.

COXALGIA.

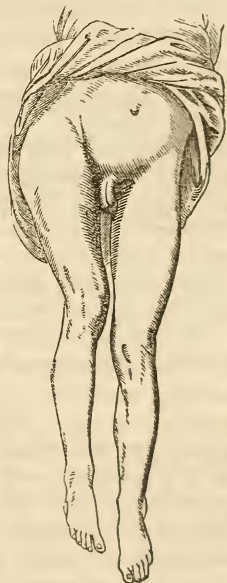
This is a disease of the hip-joint, common to scrofulous children.

Symptoms.—At first there is slight pain, referred to the knee; lameness, and stumbling in walking; tenderness in the groin, and pain is produced by pressing the head of the bone suddenly against the acetabulum; apparent lengthening of the limb. This apparent increase of length is owing to a depression of the pelvis of the diseased side, the weight of the body being supported on the opposite limb.

If the disease is not arrested, destruction of the head of the bone and acetabulum results, and the femur is drawn up, constituting a spontaneous luxation. Often an abscess forms, and opens externally. The toes may be turned inward or outward.

Treatment.—Perfect rest upon a mattress, as in caries of the spine, the limb being confined in a carved splint. Cups and leeches, over the joint, will be useful at first; subsequently, more benefit will be derived from counter-irritation by blisters, setons, and issues. Purging with jalap and cream of tartar, tonics, and iodine, are the constitutional remedies. It may require months or years to effect a cure.

Fig. 1.



FRACTURES.

Fracture is a solution of continuity of a bone, produced by external violence, or muscular contraction. Fractures are divided into oblique, transverse, and longitudinal, according to the direction. *Simple* fracture is a mere separation of the bone into two parts; *compound*, implies an open wound, communicating with the fracture; *comminuted*, when the bone is broken into numerous fragments; and *complicated*, when attended with luxation, laceration of large vessels, &c.

The *signs* of fractures are deformity, preternatural mobility, crepitation, pain, swelling, and helplessness of the part. Old age, and certain diseases of the bone, predispose to fractures; in cold weather, they are more numerous, on account of the increased muscular exertion necessary in walking, where there is ice. Indirect violence may occasion fracture, when a force is applied to the two extremities of a bone, which gives way between them. Deformity may be produced by an angular derangement, or a derangement in the direction of the axis, the diameter, or the circumference of the bone. Bent bones are occasioned by a few of the osseous fibres giving way upon the convexity of the curve. The process of reparation is more rapid in the young, and also takes place sooner in a small than in a large bone. Danger results, according to the site of the injury, the nature of the fracture, and the state of the system. The mode of reparation is attended by the following changes: extravasation of blood; after this is absorbed, the liquor sanguinis is effused, and assumes the position which the blood occupied; this consolidates; the serous portion is absorbed; the fibrin remains, and becomes organized. This period of plastic exudation lasts for eight or ten days, and then becomes cartilaginous. This mass contracts, increases in density, and gradually becomes bone. The ossification advances from the periphery. The fractured extremities are now surrounded by a bony case, termed the *provisional callus*; after which continuity is truly restored by the formation of what is called *definitive callus*, which takes place between the fractured extremities; and, finally, the provisional callus is absorbed.

Treatment.—This consists of two parts; first, *reduction*, which is to be effected gradually by extension and counter-extension, overcoming muscular contraction, and coaptating the extremities; secondly, *retention*, which is effected by keeping the limb in such a posture as will relax those muscles which would be likely to cause a displacement, and by applying such mechanical means as will prevent motion; these means consist of splints, which are variously constructed of wood, pasteboard, or metal, and applied by means of bandages or rollers; they should be light, and always of such a length as to command the neighbouring joint; the inner surface should be padded or lined, in order to prevent chafing. After being dressed, the part should be laid upon a pillow, and not disturbed, unless there should be inordinate swelling of the limb, when the bandage should be loosened. Bandages soaked in gum or starch, have recently been used, in place of splints. Under certain circumstances, this dressing is admirable, but an indiscriminate employment tends manifestly to injury; on account of the swelling of the limb, it produces pressure, which may occasion ulceration or sloughing. It is called the immovable apparatus.

The diet should be watched, and antiphlogistic means resorted to,

if necessary. At the end of three to six weeks, the provisional callus is complete, and the substitutes for this splint of nature can be discontinued; the use of the part must be resumed gradually, especially in the lower limbs.

FRACTURE OF THE NOSE.

The nasal bones are usually fractured by a fall, a violent blow, or kick of a horse, or some direct application of force. This fracture is often attended by injury of the brain, and followed by caries and exfoliation.

Treatment.—This consists of antiphlogistic means, such as leeches, cold applications, and rigid diet, to remove swelling and inflammation, and the adjustment of the fragments; which can be accomplished by a catheter, probe, or dressing forceps. The nose should not be plugged with lint, unless to check profuse hemorrhage. The parts may be retained in apposition by compresses and rollers.

FRACTURE OF THE MALAR AND SUPERIOR MAXILLARY BONES.

These can only occur by the most direct violence, or gunshot injuries, and are usually attended with crushing and wounding of the soft parts; severe inflammation and nervous symptoms may come on, and the brain may also be affected. There will be great pain and difficulty in chewing.

Treatment.—If there is no displacement, there is nothing to be done but to subdue inflammation, and keep the parts quiet. If the alveolar processes are loosened, they must be pressed into their places, and the mouth kept shut, and the patient nourished by fluids.

FRACTURE OF THE LOWER JAW.

This may occur in the base of the jaw, in the ramus or processes; and in children it may take place at the symphysis. The most frequent seat of fracture is between the chin and the insertion of the masseter muscle; the longer fragment and the chin are depressed. In double fractures, the chin alone is depressed. There is pain, swelling, inability to move the jaw, irregularity of the dental arch, crepitus, and frequently hemorrhage and deafness.

The diagnosis of fracture of the ramus and condyle is often obscured by swelling; the neck of the condyle is drawn forwards by the external pterygoid muscle, and crepitation will be perceived by the patient.

Treatment.—The teeth serve as a guide in the adjustment of the fragments, and the upper jaw acts as a splint in the retention. A compress and a pasteboard splint, retained by a suitable bandage, will retain the parts in apposition; and the patient is to be fed by

gruels and soups, through the interstices of the teeth. The union is rapid, and there is usually but little deformity.

FRACTURE OF THE SPINE.

This is attended with serious injury to the spinal cord, from compression, laceration, bruising, concussion, or from subsequent inflammation and softening. When it occurs above the fourth cervical vertebra, death is almost certain, on account of the origin of the phrenic nerve which supplies the diaphragm.

When the lumbar region has suffered, the symptoms are paralysis of the lower limbs, involuntary discharge of fæces, retention of urine, and frequently priapism.

When the injury is in the upper dorsal or lower cervical region, there is, in addition to these symptoms, paralysis of the arms, difficulty of breathing, sluggishness of the bowels, and distension of the abdomen. In all fractures of the spine, the kidneys suffer, and bed-sores are apt to follow.

Treatment.—Absolute rest upon a mattress, low diet, and antiphlogistic means, to prevent the formation of pus, and thickening of the membranes. The discharges of the bowels must be regulated, and the bladder relieved by the catheter; counter-irritation and frictions will be useful in the latter stages of the case. The use of the trephine in this injury has not met with success, and will probably do more harm than good.

FRACTURE OF THE PELVIS.

Fracture of the bones of the pelvis can only be produced by the greatest violence. There is but little displacement, although great danger results from injury to the parts within.

Treatment.—All that can be done is to place the patient at rest in an easy position, keep a catheter in the bladder, and make incisions, if urine or pus is extravasated in the perineum. The application of a broad bandage around the hips, will assist in preventing motion.

When the crest of the ilium or the anterior superior spinous process is knocked off, the fragment is displaced inwards, and can be readjusted by the fingers. Fracture of the sacrum is longitudinal usually, and there is no displacement. The coccyx may be fractured by a kick, and is displaced inwardly: re-adjustment may be effected by the finger in the rectum. The acetabulum may be split, and injury of the neck of the femur may be simulated, though there is no shortening of the limb, and crepitus is felt by the finger in the rectum, when the pelvis is moved.

FRACTURE OF THE RIBS.

The ribs are very liable to fracture, which usually is in the mid-

dle, when occurring from direct force, or force applied at each end. Displacement is seldom great, and is difficult to detect in fat persons. There is pain, swelling, and difficulty in breathing; crepitus is felt, when the hand is placed over the part during respiration or coughing; emphysema appears when the pleura is injured.

Treatment.—If there is an angular projection of the extremities, a compress is to be applied over it; if there is a depression, a compress is to be placed at each extremity; the chest is to be surrounded by a roller, in order to prevent respiration by the intercostal muscles, and thus to keep the parts at rest. Inflammation and cough are likely to ensue, and must be treated by antiphlogistic means and anodynes.

Compound fracture of the ribs is treated of, under the head of Wounds of the Chest.

FRACTURE OF THE STERNUM.

Fracture of this bone is rare, great violence being necessary to produce it; injury usually is done to the thoracic viscera. The deformity is generally a depression, and the symptoms are great difficulty of respiration, pain, palpitation of the heart, and perhaps spitting of blood, and cough. Caries, or a pulmonary affection, often result from a fracture of the sternum or ribs in scrofulous habits.

Treatment.—The local treatment consists of a compress and a roller, applied upon the same principles as in fracture of the rib. The general treatment must be adapted to the inflammatory conditions of the organs of the chest. Collections of pus and blood behind the sternum can be evacuated with a trephine, but the operation is often attended with unfavourable results.

FRACTURE OF THE SCAPULA.

The *acromion* process is sometimes fractured; the shoulder loses somewhat of its roundness, the head of the humerus falls slightly, and there is a slight depression at the point of fracture. It is distinguished from dislocation by mobility of the joint, and crepitation can be felt by rotating the head of the humerus.

Treatment.—It may unite by bone, but generally it unites by ligament. It is to be kept in its place, by elevating and firmly fixing the os humeri; this is effected by placing a cushion between the side and the elbow, and retaining it by a roller, the elbow being carried a little backwards. If the pad be placed in the axilla, and the elbow be brought close to the side, the fragments will be separated; but little inflammation follows, and bandages may be removed in three weeks. In many individuals, the tip of the acromion process is slightly movable, being merely united by ligament.

The *neck of the scapula* is rarely fractured, and it is liable to be

mistaken for a dislocation; the shoulder falls; there is a hollow below the acromion, from a sinking of the deltoid muscle; and the head of the humerus can be felt in the axilla. It can be recognised by the facility with which the parts are replaced, the falling of the head of the bone into the axilla, when the extension is removed, and by crepitation.

Treatment.—The first point is to carry the head of the humerus outwards, and the second to raise the glenoid cavity and arm. The former is effected by a thick cushion confined in the axilla by a bandage, and the latter by placing the arm in a short sling. Ten or twelve weeks are necessary to procure union, and a still longer time to recover the strength of the arm.

The *coracoid* may be fractured by direct violence; the process is drawn downwards, by the action of the coraco-brachialis, pectoralis minor, and biceps muscles. There is pain, swelling, and crepitation in the part, and loss of power in the limb.

Treatment.—This consists in making the fingers of the injured limb touch the shoulder of the opposite side, the position being secured by bandaging.

The *body* of the scapula may be fractured either vertically or transversely, and there is but little displacement, unless it is near the lower angle of the scapula. When the angle is fractured, it may be drawn forward and upward.

Treatment.—This consists of a tight roller around the chest; the arm being placed in a sling.

FRACTURE OF THE CLAVICLE.

This fracture is frequent, and is usually produced by violence upon the shoulder, arm, and hand. It is generally oblique, and near the middle of the bone; the part is painful and swollen, and every attempt at motion produces pain; the shoulder is sunken, and drawn towards the sternum, and the acromial fragment is drawn downward by the weight of the arm, and forward and inward by the action of the subclavius muscle. The patient usually supports the arm with his other hand, to relieve the pressure upon the axillary plexus of nerves. The indications are plain, viz.: to elevate the shoulder; to keep it outward from the chest; and to draw it slightly backward.

Treatment.—The mode of dressing this fracture is extremely various. *Dessault's apparatus* consists of a compress placed over the fracture, a wedge-shaped pad placed in the axilla, and retained by a roller which surrounds the chest. The elbow is to be brought to the side, and the arm and chest surrounded by circular turns of a second roller, whereby the shoulder is elevated and drawn outwards. A third and last roller commences at the armpit of the sound side, and being carried obliquely over the compress, descends

the posterior portion of the arm, passes under the elbow, and obliquely upwards across the chest to the armpit, whence it started; then over the back to the shoulder of the affected side, across the compress, down in front of the arm, under the elbow, and across the back to the sound armpit again. This bandage serves to retain the arm and shoulder in its elevated position.

Fox's apparatus consists of a wedge-shaped pad, secured by strings to a circular collar which surrounds the shoulder of the sound side, and a sling made of linen, which contains the forearm; it elevates the shoulder, and, by bringing the elbow to the side, draws the shoulder outwards.

Some use merely a pad and two handkerchiefs, which, if properly applied, can be made to fulfil all the indications.

Some deformity almost always results.

FRACTURE OF THE HUMERUS.

The *anatomical neck* is the seat of fracture in young persons, and sometimes in old. There is little or no flattening of the shoulder, owing to the head of the bone remaining in its place; the end of the shaft is directed obliquely upwards and forwards, and projects on the coracoid process; the arm is shortened, and crepitus is distinct after slight extension and coaptation of the fragments.

Treatment.—This requires a pad in the axilla, a splint on the fore and back part of the arm, a roller, and a sling for the hand, the elbow hanging free.

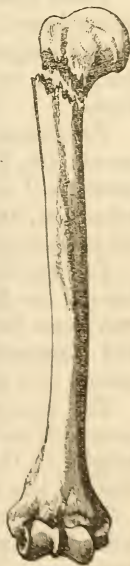
The Surgical Neck.—The upper fragment remains in its place, but its lower extremity inclines slightly outwards; the upper end of the lower fragment is drawn upwards and inwards under the pectoral muscle; the shoulder is round, the arm shortened, the elbow abducted, and there is crepitation upon adjustment.

Treatment.—A pad is placed in the axilla; two splints secured by a roller; the hand supported by a sling, and the elbow free.

Fracture at the Neck may be accompanied with *dislocation*. This is recognised by the tumour in the axilla, formed by the head of the bone, which does not move when the shaft is rotated.

Treatment.—An effort should be made to restore the head of the bone, and then to coaptate the extremities: this is often impossible; then the extremity of the lower fragment should be brought to play in the glenoid cavity. A pad will be necessary in the axilla, and the same dressing as the last. A new joint is formed, and the motion of the arm are only partial.

Fig. 2.



The *shaft* may be fractured at any point, and is easily recognised by crepitation; and when the fracture is just below the surgical neck, the lower extremity of the upper fragment is drawn inwards by the muscles inserted into the bicipital ridges, and the upper extremity of the lower fragment is drawn outwards by the deltoid muscle.

Treatment.—The reduction is easy, and the extremities may be retained in contact by four small splints placed around the arm, and secured by a roller, which, as in all other instances of its use in the upper extremity, must commence at the hand. The forearm should be suspended in a sling.

The *condyles* are fractured in various ways. Either condyle may be fractured, most frequently the internal; or, there may be a fracture between the two condyles, and another separating them from the shaft. These injuries are distinguished from dislocation at the elbow by mobility and crepitation.

Treatment.—By a roller and two angular splints (Physick's), reaching to the hand from the middle of the arm. The angle of the splints must be changed to prevent ankylosis. Some deformity and stiffness often remain.

FRACTURE OF THE RADIUS AND ULNA.

When both bones of the forearm are fractured at once, or when either bone is fractured near the middle, there is but little difficulty in the diagnosis, being easily recognised by the ordinary signs of fractures, such as pain, crepitus, swelling, and uselessness of the limb.

Treatment.—The great object is to preserve the interosseous space; for, if the fragments unite at an angle, supination and pronation will be prevented. The fracture is readily reduced by slight extension, and then the muscles should be pressed into the interosseous space, in order to separate the two bones.

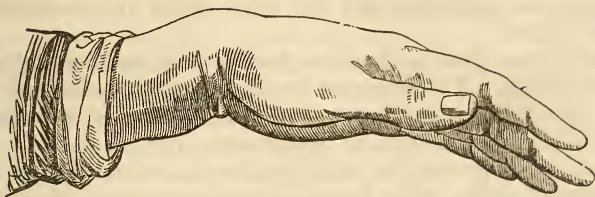
Two splints, well padded on the inside, reaching from the elbow beyond the fingers, should be applied, and retained by a roller. The arm must be kept in a position between supination and pronation, and supported by a sling; after two or three weeks pasteboard splints or a starch bandage may be substituted.

The *RADIUS* is more frequently fractured than the ulna, on account of its articulating with the carpus, and thus receiving the weight of the body in falls, &c. When fractured near the middle there is but little deformity, the ulna acting as a splint.

The *neck* of the radius is but rarely fractured, and the accident is difficult to recognise, especially when the muscles covering it are very large. It is to be discovered by fixing the head of the bone, and rotating the hand and forearm.

The *lower extremity* of the radius is often fractured, and frequently mistaken for a dislocation of the wrist. (Fig. 3.)

Fig. 3.



Fractures of the radius are to be treated upon the same principles, and by the same means as in other fractures of the forearm, unless the fracture should be through the articular surface of the carpal extremity of the radius. This latter fracture gives a peculiar deformity to the wrist, dependent upon a partial luxation of the carpus. In this instance, besides the ordinary splints, two small compresses are to be applied, one upon a prominence on the dorsal surface caused by the fragment, the other upon the projecting extremity of the radius on the palmar side. Of course these compresses will not be opposite to each other. Passive motion should be established in

Fig. 4.



Fig. 5.



a week, for fear of ankylosis, and the loss of the pulley-like motion of the extensor tendons on the back of the radius.

The *ULNA* is most frequently fractured below the middle of the shaft. The lower fragment approximates the radius by the action of the pronator quadratus, and the other usual symptoms of fracture are evident.

The *olecranon* process is often fractured by sudden violence, or muscular action. The fragment is drawn up upon the back of the arm by the triceps muscle, and the deformity is increased by flexion. The union is usually ligamentous. (Fig. 4.)

The *coronoid* process is rarely fractured, and usually by inordinate muscular action of the brachialis anticus muscle, whose tendon is inserted in front of the base of this process. Dislocation backwards by the action of the triceps may result. The union will be ligamentous. (Fig. 5.)

Treatment.—Fractures of the shaft are to be treated by two splints and compresses, as are those of the radius. Fracture of the olecranon is to be treated by extending the elbow, placing a small splint in front of the joint, and securing it by a roller. The coronoid is to be treated by flexing the elbow, the fingers touching the opposite shoulder, applying a roller to relax the muscles and prevent their action, and keeping the forearm in a sling to the utmost.

FRACTURE OF THE CARPUS, METACARPUS, AND PHALANGES.

The bones of the carpus are seldom fractured. The injury is usually a compound one, and produced by direct force.

The metacarpal bones are subject to simple fracture, which is easily recognised by pain, swelling, crepitus, &c. The treatment consists of coaptation of the fragments, and retaining them by means of two splints and interosseous pads, or compresses.

The *phalanges* are liable to compound and simple fracture. Simple fractures to be treated by two or four small splints, and a narrow bandage; when several fingers are broken, a carved splint will be useful.

FRACTURE OF THE FEMUR.

The *neck* may be fractured within the capsule. This occurs most frequently in old persons, and in females, on account of the bony texture being more brittle in advanced life, and on account of the anatomical character of the neck of the femur in women. The accident may be produced by a slight fall, muscular contraction, blows, &c. The head of the bone remains in the acetabulum; the lower fragment is drawn upwards by the muscles of the hip, and the foot is everted, owing to the action of the rotator muscles. The limb is shortened, the trochanter is one or two inches higher and

flatter than its fellow; there is pain, crepitus, and want of voluntary motion. The arc which the trochanter, upon rotation, will describe, will be of a much smaller circle than that described by the rotation of its fellow.

Union is possible, but improbable; on account of the difficulty of coaptating the fragments, the want of provisional callus, the fractured extremities being bathed in an increased quantity of synovia, and the feeble nutrition of the head of the bone through the round ligament. Yet, in a young person of good constitution, where the periosteum is not completely severed, there may be bony union. Ordinarily, there results a false joint, thickening of the capsule, partial absorption of the fragments, and the patient is lame for life, and requires a stick or crutch. Feeble old women may die from the shock of the injury, or from the irritation of pain and confinement.

Treatment.—Extension and splints are unnecessary—the limb should be supported by pillows, and motion restrained. Care should be taken with reference to bed-sores, sloughs, &c.

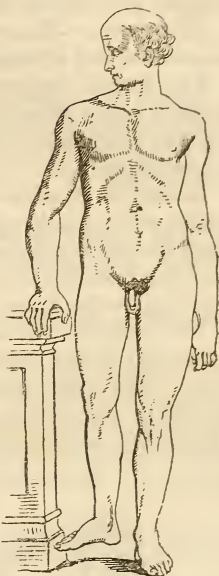
The *neck* may be fractured partly within and partly without the capsule, in which case the prospect of union is much more favourable. Or, the extremity of one fragment may be driven into the cancellated structure of the other, constituting an *impacted* fracture; in these cases, crepitus is obscure, the displacement is slight, and there is considerable power and motion of the limb, and but little shortening and eversion. They are produced by great direct force, and are attended with great pain, swelling, and constitutional disturbance. The treatment may be successful in many instances, without the use of splints.

The *trochanter major* may be fractured; the process is drawn upwards by the glutei muscles, and a space can be felt between the fragments. Approximation and retention are difficult, and the union generally ligamentous. The cure is to be effected by rest, position, and relaxing the muscles.

Fracture of the condyles is a serious injury, especially when communicating with the joint. After the fragments are somewhat consolidated by rest and position, passive motion must be established to prevent ankylosis.

Fracture of the *shaft* is easily recognised by shortening, crepita-

Fig. 6.



tion, &c. &c. The deformity is greater when it occurs in the upper part, especially when just below the troncchanters, the lower end of the upper fragment being tilted forward by the action of the psoas magnus and iliacus internus muscles.

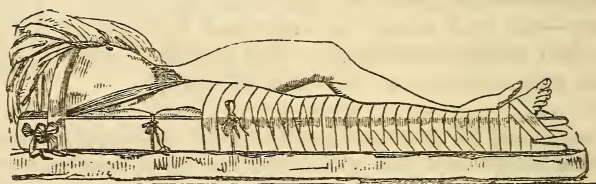
Treatment.—The principles of treatment are, as in all fractures, coaptation and retention, but the means to effect it are various.

The double inclined plane is a simple contrivance. The leg is secured to one plane, which furnishes the means of counter-extension and the thigh rests on the other; the weight of the body produces the extension.

Dessault's Apparatus.—Consists of an outer splint, three or four inches wide, reaching from the crest of the ilium to four inches beyond the foot, each extremity having a hole in it; an inner splint reaching from the perineum to the sole of the foot, and an upper splint reaching to the knee.

The counter-extension is made by a band in the perineum, which is secured to the upper end of the outer splint by means of the hole in it. The extension is made by a band or handkerchief applied to the ankle, and secured to the hole in the lower end of the outer splint. Liston uses only the outer splint, as represented in the figure.

Fig. 7.



Dr. Physick's modification consists in an elongation of the outer splint, nearly to the axilla; by this means counter-extension is made in a line more nearly parallel with the axis of the body, and a block was placed upon the inner side of the lower end of the same splint, below the foot, for the purpose also of preventing the line of extension being oblique, which might produce pain and deformity. Bags of bran are placed on each side of the limb, so as to secure uniform pressure from the splints, and the whole is secured by bandages.

Hagedorn's Apparatus consists of one splint reaching from the hip to a foot-board.

The counter-extension is made at the acetabulum of the sound side, and the extension by the foot of the injured side. The splint is first applied to the outer side of the sound limb, and the foot secured to the foot-board; and the extension is made by drawing the foot of the fractured limb down to the foot-board, and securing it. This avoids the necessity of a perineal band, which may exco-riate.

Dr. Gibson's modification of this apparatus consists in an elongation of the splint as high as the axilla, which will prevent any lateral inclination of the body; and the application of a similar splint to the fractured limb.

FRACTURE OF THE PATELLA.

The accident may result from muscular contraction or direct violence. It is sometimes attended with an audible snap and falling of the patient; the pain is not severe, and a simple fracture is not dangerous. The limb is bent partially, and there is no ability to extend it.

The direction is usually transverse, and a separation of the fragments can be felt. There is no crepitus. Considerable swelling usually follows.

Longitudinal fractures are rare, and are not attended by the same symptoms.

Treatment.—Leeches and lotions should be applied to reduce swelling and inflammation, and then the limb should be extended, a roller and figure of 8 bandage applied to coaptate the fragments and compress the muscles of the thigh. A long splint, reaching from the ischium to the heel, applied to the back of the limb, will prevent motion.

Bony union is not to be expected; a strong ligamentous connexion is usually formed, which answers the purpose extremely well. Passive motion should be made after five or six weeks. Sixty or seventy *days* will elapse before the limb can be used; and even then, caution should be taken that the newly-formed ligament be not broken. The patella of the opposite side is liable to fracture; for it possesses the same structure which predisposed to fracture in the other limb, and there is increased muscular exertion of the sound limb.

FRACTURE OF THE LEG.

A frequent accident, occurring in one or both bones, from a fall or direct violence. The *tibia* is most frequently fractured, on account of its exposed position, and sustaining the weight of the body. The fracture may occur at any part, but the deformity is greater, as it may be nearer the lower extremity; if nearer the upper extremity the deformity may be slight and the patient even walk about.

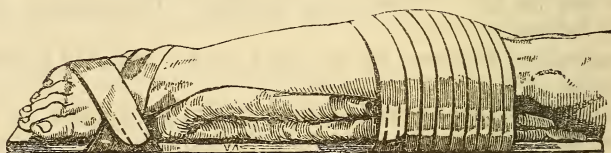
The fibula may be fractured by direct or indirect force. Little deformity results, unless the fracture is below its middle. When nearer the ankle, dislocation may be produced. The most frequent seat of fracture is from two to three inches above the malleolus. There is immediate lameness; the foot is turned out; crepitus is distinct, and a depression exists over the fractured part.

Both bones are often fractured at once by falls or blows; they

occur at the weakest points. The signs are evident: crepitus, pain, want of motion, &c. There is seldom any great shortening, and the deformity is readily reduced.

Treatment.—When both bones are fractured, when the tibia alone is fractured, or, when the upper part of the fibula is fractured, the best and most simple apparatus is the fracture-box and pillow. The fracture-box has a foot-board, to which the foot is secured by a bandage, thus preventing any lateral inclination. In lieu of this, two splints of the length of the leg, applied on either side of the pillow, will answer the purpose, care being taken to support the foot by a bandage or handkerchief.

Fig. 8.



Fractures of the lower end of the fibula are to be treated by Dupuytren's or Physick's apparatus; which consists of a single splint, placed on the inner side of the leg, and reaching beyond the foot. It is provided with a wedge-shaped pad, which reaches only to the ankle, the larger end of which being applied to the internal malleolus; a bandage is carried over the ankle in such a manner as to produce inversion of the foot, making the sole of the foot approximate the splint, and thus fragments are adjusted and the deformity removed.

FRACTURES OF THE BONES OF THE FOOT.

The *os calcis* may be fractured by great violence connected with the action of the sural muscles. The tuberosity will be drawn up by the tendo Achillis, and the patient is unable to stand.

The *treatment* consists in overcoming the action of the triceps suræ, flexing the leg upon the thigh, and extending the foot upon the leg. The fragments are to be approximated by a figure of 8 bandage.

The *astragalus* is rarely fractured; it may occur at the posterior part where the tendon of the flexor longus pollicis plays over it; or it may occur between the body and the head. In the first instance the foot will be inverted, in the latter but little deformity will occur.

It can be *treated* successfully by a simple fracture-box. Should caries take place it may become necessary to extirpate it.

The *metatarsal* bones and the *phalanges* are seldom fractured, unless the injury be complicated or compound.

COMPOUND FRACTURE.

Unless a wound communicate with the fracture, it is not compound. The wound may be produced by the means which broke the bone, by the bone protruding, or by subsequent ulceration. Great danger may result from the shock, hemorrhage, tetanus, suppuration, hectic, or typhoid fever.

Primary amputation is necessary if the bone is much shattered; if a joint, especially the knee-joint, is opened; if large arteries are torn; if the soft parts are extensively lacerated or bruised, particularly if the patient is old or enfeebled by disease.

The *treatment*, if it be determined to try to save the limb, will be to convert the fracture into a simple one, by arresting bleeding, removing pieces of bone, clots, &c., so the wound will heal without suppuration. To reduce the protruding fractured extremities, it may be necessary to saw off a portion; to arrest the hemorrhage, it may be useful to envelope the parts in bran, or stuff the opening with lint, which must be removed as soon as suppuration occurs.

The subsequent part of the treatment may require antiphlogistic, but more frequently tonic measures, such as bark, wine, good diet, &c., especially if the discharge is profuse. Secondary amputation may be necessary at last.

DISLOCATIONS.

Dislocation or luxation, is the removal of a bone from its articulating cavity. The ball and socket joints are most liable to the injury.

The *predisposing causes* are the peculiarity of the construction of the joint, weakness or paralysis of the muscles, elongation of the ligaments, particular position of the parts, accumulation of fluids in the joint, or diseases and fractures of the bones.

The *exciting causes* are external violence; such as blows, falls, &c., and muscular contraction.

The *symptoms* are deformity, swelling, and a hollow where none should be, shortening or elongation, pain and immobility of the limb.

The *consequences* are rupture of ligaments, effusion of blood and serum; lymph coagulates, forms new adhesions, and fills up the old socket, and the head of the bone gradually accommodates itself to its new position, there always being some attempt to form a new socket; and thus considerable motion is subsequently acquired by the limb.

Dislocation is to be distinguished from fracture by the absence of crepitus, the rigidity of the limb, the peculiarity of the deformity at the articulation, and by the absence of deformity after reduction; whereas in fractures it will recur without being prevented by dressings.

Treatment.—This essentially consists in overcoming the action

of the muscles which retain the bone in its unnatural position, and also in bringing the head of the bone into such a situation that the action of the muscles may draw it into its place.

Constitutional means are often necessary to effect reduction in the larger joints, such as bloodletting, warm baths, emetics, in order to produce relaxation of the muscles. The local means are extension and counter-extension. The extension must be made gradually, in order to overcome the action of the muscles, and to place the head of the bone in such a situation as to be drawn into its place, and the extension must be withdrawn suddenly, in order that the muscles may have the effect by their contraction.

The treatment subsequent to the reduction consists in maintaining the limb at rest, and applying leeches and cold applications to remove swelling and pain. Afterwards, if any stiffness remains, stimulating friction may be used.

Subluxation implies a partial removal of the head of a bone from an articulating surface. *Recent* and *old*, are terms applied to luxations with reference to the period which may have elapsed, and the changes which may have occurred by adhesions, &c.

Compound Luxation.—This is connected with a wound in the integuments, fracture of bone, laceration of large vessels, &c. The same principles apply as in compound fracture. The same contingencies of age, temperament, and constitution, will influence the treatment. The question of amputation is first to be considered, and then the reduction. The after treatment would be that for a wound of the joint: careful closure of the wound,—prevention of inflammation by antiphlogistic means; if possible preventing supuration, ankylosis, and tetanus.

DISLOCATION OF THE JAW.

Dislocation of the jaw may be caused by spasm of the pterygoid muscles when yawning, or by a blow on the chin when the mouth is wide open. The condyles are pushed forwards, and rest in front of the base of the zygomatic process of the temporal bone.



Fig. 9.

Symptoms.—The mouth gapes and cannot be shut, the glenoid cavity is vacant, and there is a prominence felt beneath the zygoma; the saliva trickles, articulation is prevented, and there is great pain.

Treatment.—The patient should be seated on a low stool, and the surgeon standing in front, should press his thumbs, properly protected, upon the last molar teeth, at the same time elevating the chin with the fingers. The condyles are thus extracted from their unnatural position, and returned to their socket by the normal action of the muscles, which produces an audible noise. In difficult cases, greater leverage may be obtained by using two forks or strong pieces of wood, connected by a string in such a way that it will elevate the chin, whilst the ends are pressed against the teeth in place of the thumb. When the resistance is great the efforts may be directed first to one side at a time.

After reduction, the chin should be confined by a bandage for a week or ten days.

DISLOCATION OF THE SPINE.

This accident rarely happens unless connected with fracture; although it has occasionally occurred in the cervical vertebræ.

It may be produced by the muscular effort of convulsion and mania, but more frequently is the result of violence; for instance, falls from a height, crushing by wheels, hanging, &c.

The chance of life is but small on account of injury done to the spinal marrow. The displacement is easily recognised by the deformity, paralysis, &c.

Dislocation of the atlas upon the dentata may occasion instant death, by the intrusion of its tooth-like process into the spinal marrow. Dislocations of the oblique processes simply may terminate with no other inconvenience than contortion of the neck and restricted motion of the head. The action of the diaphragm may be suspended by compression of the phrenic nerve.

Dislocations of the bodies of vertebræ of the neck and back, are almost necessarily accompanied by fracture.

Treatment.—But little is to be expected. Great care is required in extension and coaptation. In the neck, danger is to be apprehended from an attempt to reduce the deformity. Contusion of the muscles may produce a deformity which may resemble dislocation.

Subluxation or *partial* dislocation is more common; and it may terminate without permanent injury to the spinal marrow; provided the antiphlogistic system is pursued in all the details of rest, diet, purging, cups, &c.

DISLOCATION OF THE RIBS.

The *vertebral* extremity of the ribs can only be dislocated by severe falls, or blows upon the back, on account of its double articulation, and its protection by the muscles of the back. The *sternal* extremity is sometimes loosened from the cartilage by violent bending of the body backwards;—great pain and difficulty of breath-

ing follows. Reduction can be effected by deep inspiration, slightly bending the body backwards and making some pressure on the projecting point. The subsequent treatment is the same as that for fracture of the rib.

DISLOCATION OF THE CLAVICLE.

The clavicle may be dislocated at either extremity, and is more rare than fracture.

The *sternal* end may be dislocated upward, backward, and forward. (Fig. 10.) When dislocated upward, the sternal extremity approaches its fellow, and is much more elevated than the acromial extremity. When dislocated backward, which is more rare, there is a depression over the articulation, pain and stiffness in the neck, and difficulty of swallowing. When the direction is forward, which is the most frequent, it is produced by force applied at the opposite extremity. It is characterized by a projection over the spot, inclination of the head to the affected side, pain upon moving the arm, and the shoulder is brought near to the chest.

The *reduction* is easy,—by means of extension and counter-extension; there is more difficulty in preventing a recurrence of the accident. Dessault's apparatus for fractured clavicle should be applied. But even with the greatest care, greater or less deformity commonly remains, which, however, does not interfere with the motions of the arm.

The *scapular* end is generally dislocated upwards. Although sometimes it slides beneath the acromion. It is usually the result of a fall; and is recognised by pain, impeded motion, depression of the shoulder, and the clavicle resting on top of the acromion occasions a projection.

Reduction is effected by elevating the shoulder and depressing the corresponding end of the clavicle. Dessault's bandage is then to be applied, and the part kept at rest. Some displacement usually remains, which does not prevent motion of the shoulder.

DISLOCATION OF THE ARM.

This is the most frequent dislocation, on account of the mobility of the shoulder joint, its constant exposure to injury, and the shallowness of the glenoid cavity, compared to the size of the head of the humerus.

It may be displaced in three directions; viz., inwards, downwards, and backwards. In dislocation inwards, the elbow stands out from the body, and is inclined a little backward; a protuberance is felt beneath the pectoralis major muscle, and there is frequently shortening of the limb.

In dislocation downwards, which is the most common displacement, the arm is lengthened, and there is great rigidity and

immobility; the elbow stands out from the body; there is a hollow under the acromion process, and a prominence in the axilla.

In dislocation backward, which is most rare, the elbow is inclined inward and forward, the head of the bone forms a prominence beneath the spine of the scapula, and there is a hollow beneath the acromion, together with rigidity and immobility.

Violence and contraction of the muscles *pectoralis major*, *latissimus dorsi*, *teres major*, and *deltoid*, are the causes of dislocation of the arm. The immediate injury is a laceration of the capsule, contusion of the muscles, and effusion of blood, and often paralysis of the *deltoid* muscle from compression of the axillary nerve. Unless reduction is effected the parts become united by adhesions,—after which reduction cannot be produced without danger of lacerating the artery.

Fig. 10.

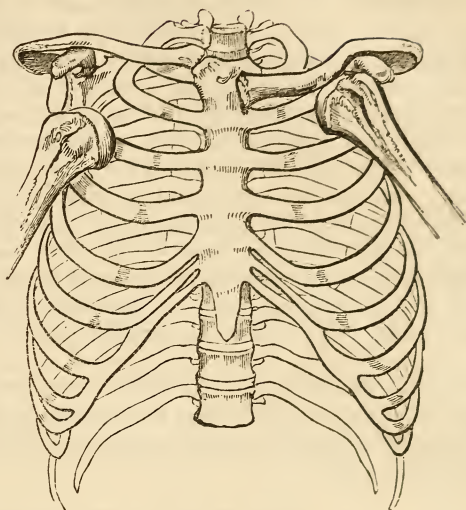
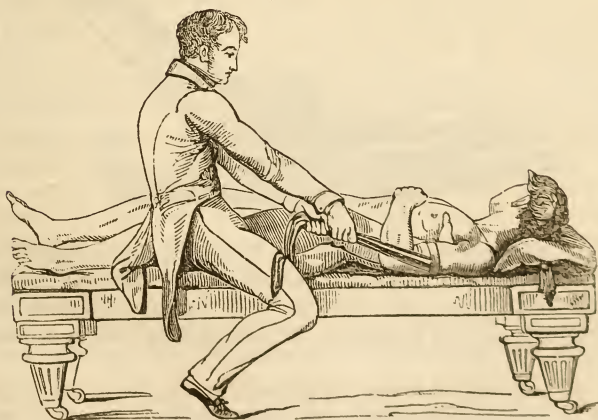


Fig. 11.



The *reduction* is managed in different ways. The ordinary plan is to place the patient on the bed, and then to place a spherical pad in the axilla. The surgeon makes counter-extension with his foot upon the pad, and extension with his hands. If this force is not sufficient, counter-extension may be made by passing a folded towel or sheet under the axilla, and securing the ends to the bed-post; and extension by fastening a folded sheet or long towel to the wrist or elbow by a damp roller; thus several assistants can make extension at once. If this force is not sufficient, pulleys may be employed, taking care that the extension be made very gradually.

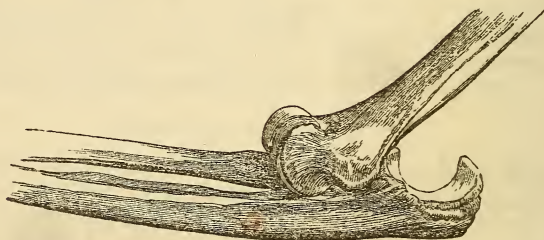
The elbow has this advantage over the wrist, as a point of application of the extending band,—the elbow can be bent, and thus a greater rotatory movement of the head of the bone produced. The wrist is preferred by some, on account of there being no muscles compressed, whose contraction might interfere with the reduction.

After reduction, which is recognised by cessation of pain, rotundity of the shoulder, and mobility of the limb, the arm should be kept in a sling, and not used for several days. Should paralysis of the deltoid continue, it may be relieved by stimulating lotions, blisters, moxas, &c.

DISLOCATIONS AT THE ELBOW.

When both radius and ulna are dislocated at the elbow, the forearm is bent nearly at a right angle, and is immoveable. The olecranon forms a prominence behind, and the articular extremity of the humerus, covered by the brachialis anticus muscle, forms a protuberance in front. The coronoid process of the ulna is received

Fig. 12.



into the greater sigmoid cavity of the humerus, and tends to maintain the bones in their unnatural situation. A *lateral* dislocation inwards may also occur, in which there is a great projection of the external condyle of the humerus, in addition to the symptoms of the first variety.

When the ulna alone is dislocated backwards, the olecranon forms a marked projection posteriorly, the elbow is bent at right angles, and the forearm is pronated.

Reduction of the above forms of dislocation is effected by making forcible extension of the forearm over the surgeon's knee, which is to be placed at the elbow, to make counter-extension. The forearm is to be bent while extension is produced.

The *radius* is dislocated at its upper extremity, either forwards or backwards. Backwards is the most frequent displacement. The head of the bone forms a prominence behind, the arm is bent and the hand is prone. When displaced anteriorly, there is a distinct prominence in front, the arm is slightly bent, but cannot be completely flexed, and there is some pronation.

The *reduction* is effected by making forcible extension and pronation at the same time, if the displacement be anteriorly; if the displacement be posteriorly, supination is to be produced with extension. In both, the head of the bone is to be pressed upon by the surgeon's thumb, in order to facilitate its sliding into its proper place.

Dislocation at the elbow occurs but rarely, on account of the ginglymoid character of the joint, and is generally accompanied by considerable laceration of the soft parts. Rest, cold applications, and a sling, are subsequently required, together with general antiphlogistic means.

It is produced, most frequently, by force applied to the wrist, and when complicated with fracture of any of the processes, ankylosis, gangrene, and other dangerous results may follow, especially if the reduction is delayed, and adhesions have formed.

DISLOCATIONS AT THE WRIST.

The *radius* and *ulna* may be separated from the carpus, either anteriorly or posteriorly. When dislocated *forwards*, there is a great projection in front, and the hand is bent backwards; when backwards, the projection is behind, and the hand is flexed.

It is produced by violent bending of the hand, and is accompanied by rupture of the ligaments and stretching of the tendons. The *reduction* is easily effected by extension and pressure. Pain, swelling, and stiffness of the joint may follow, which are to be obviated by cold applications, rest, lotions, &c.; if there should be a tendency to its reproduction, a light splint may be applied.

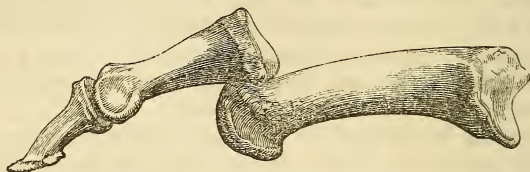
If the *radius alone* is dislocated from the carpus, which is generally anteriorly, the hand will be somewhat twisted, the radial side of it being thrown backward. The *ulna* may be dislocated backwards upon the radius, rupturing the saciform ligament, and producing a projection on the back of the wrist, by which it is easily recognised. It is readily reduced by pressure and extension. A splint and bandage may be necessary to prevent its recurrence.

DISLOCATION OF THE BONES OF THE HAND.

Displacement of the bones of the *carpus* rarely occurs. Occa-

sionally there is a dislocation of the *phalanges* of the fingers, but more frequently the dislocation backwards of the first phalanx of the thumb upon the metacarpal bone.

Fig. 13.



Reduction is effected by making extension in a curved line, by means of a narrow bandage or tape, firmly applied by a clove-hitch upon the phalangeal extremity. In some instances it may be necessary to divide the lateral ligament.

DISLOCATIONS OF THE FEMUR.

Dislocations of the thigh may occur in five directions:—1st, upwards and backwards, on the back of the ilium (Fig. 14); 2d, in-

Fig. 14.



Fig. 15.



wards and downwards, into the foramen ovale (Fig. 15); 3d, backwards, into the ischiatic notch (Fig. 16); 4th, upwards and forwards, on the horizontal ramus of the pubes (Fig. 17); 5th, downwards, under the tuberosity of the ischium. The first is the most common, the fifth is the most rare.

Fig. 16.



Fig. 17.



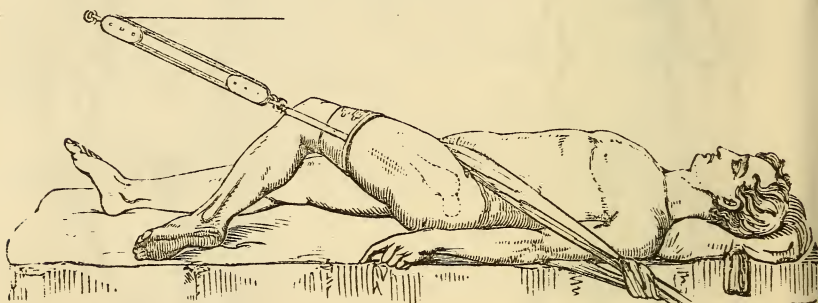
In the most frequent displacements *upwards and backwards*, the limb is shortened from an inch and a half to two inches and a half; the toes rest on the opposite instep; the knee is turned inwards and slightly bent; the limb may be bent across the other, but cannot be moved outwards; the trochanter is less prominent, and nearer the spine of the ilium; and if the patient is thin, and there is no swelling, the head of the bone can be felt in its new position, and the rounded form of the hip is lost. It is to be distinguished from a fracture of the neck of the bone by the position of the foot and the rigidity of the limb.

The reduction is the most difficult of all dislocations, and must be attempted as soon as possible after the displacement. If it is not produced, the head of the bone will adapt itself to its new position

by the formation of a new cavity, and the patient will gradually be able to walk, the toes merely touching the ground. Bleeding, a warm bath, and tartar emetic must be administered, according to the patient's constitution, in order to produce relaxation of the muscles. Counter-extension is to be made by a folded sheet or large towel placed in the perineum, the patient being in the recumbent position, and secured to a ring or hook firmly fastened in the wall or floor.

Extension is to be effected by securing a folded towel or sheet above the knee, by means of a damp roller; this towel is to be acted upon gradually, by numerous assistants or by pulleys. The

Fig. 18.



extension is to be made gradually, in such a direction as to draw the thigh across the opposite one, a little above the knee. A third band or towel is to be passed around the pelvis, in order to fix it more firmly, the ends of which are to be tied on the sound side, which is to be given to an assistant.

Dislocations *backwards* in the sciatic notch are next in point of frequency. The head of the bone rests on the pyriformis muscle, between the sacro-sciatic ligaments and the upper part of the notch, a little above the level of the middle of the acetabulum. The shortening and inversion of the foot is not so great as in the first variety; the head of the bone can seldom be felt; the joint is extremely rigid, and motion of the limb almost impossible. In reducing this dislocation it is necessary that the head of the bone should first be brought out of the notch, before it can be restored to the acetabulum.

Dislocations *downwards and inwards* are comparatively rare; the limb is elongated nearly two inches; the foot is advanced, though neither inverted or everted; the thigh is abducted, and cannot be brought near to its fellow; the psoas and iliacus muscles form a ridge which can be seen or felt; the trochanter is flattened and depressed, and the space between it and the anterior superior spinous process of

the ilium is much increased. To reduce this form, counter-extension is to be made outwards by a band across the upper and inner part of the thigh: extension is to be made at the knee, which is gradually to be made to approximate its fellow.

In dislocation *upwards and inwards*, the head of the bone rests upon the horizontal portion of the pubes, under Poupart's ligament, where it forms a tumour. The limb is shortened an inch, and the foot is turned outward, and cannot be rotated. The reduction is effected by extension in the axis of the body.

Reduction of the thigh is indicated by an audible noise when the head of the bone returns to its socket, by the natural length and direction of the limb, by the cessation of pain, and the free motion of the joint.

After reduction there is sometimes a slight elongation of the limb, which depends upon the swelling of the ligaments of the joint. The patient should be kept at rest, and may require antiphlogistic treatment; walking should not be attempted for several weeks.

DISLOCATIONS OF THE KNEE.

Dislocation at this joint is rare on account of its great strength. The displacement may be forwards, backwards, and laterally; it is usually incomplete and readily reduced.

The reduction is accomplished by extension of the leg and coaptating the extremities of the bones. Subsequent inflammation and its results, ankylosis, suppuration, &c., are to be avoided by strict antiphlogistic means; sustaining the weakness of the joint by splints or rollers, and removing the stiffness by lotions and frictions.

The *semilunar cartilages* are sometimes displaced by twisting the joint, especially if an unusual relaxation of the ligaments should exist. The limb is immediately rendered stiff, and the pain is severe and sickening. Extreme flexion usually is sufficient to restore the parts to their position, although the pain and swelling remain for some time and require attention.

DISLOCATIONS OF THE PATELLA.

The patella may be dislocated anteriorly, posteriorly, and laterally. *Outwards* is the most frequent displacement, and is characterized by the leg being stretched, a prominence externally formed by the patella, and a projection internally of the internal condyle.

Reduction is effected by raising the leg and resting the patient's heel on the surgeon's shoulder, thus relaxing the muscles of the thigh; at the same time the patella is to be forced into its place with the hand. This bone can only be displaced *upward* by a rupture of its tendon, and *downward* by a laceration of the rectus muscle. It may be displaced by semi-rotation, one edge resting on the trochlea

of the femur, and the other forming a prominent ridge. Extreme flexion and coaptation will reduce it.

DISLOCATION AT THE ANKLE.

This accident is usually the result of severe force, and accompanied by fracture of the malleoli. The displacement may be forward, backward, inward, and outward.

Dislocation of the tibia *inward* is the most frequent, and owing to a fracture of the external malleolus, the foot is everted and the internal malleolus greatly projects.

Reduction is effected by extension of the foot and flexion of the leg, so as to relax the gastrocnemius muscle. Dislocation of the tibia outward is occasioned by a fracture of the internal malleolus, and the deformity is the reverse of the last. Dislocation backwards may result from a fracture of the posterior extremity of the astragalus, in which instance the foot is inverted as in varus; this is more rare than dislocations forward, which result from fractures of the lower end of the fibula. There is danger of suppuration and gangrene, especially if connected with an external wound. Amputation will often be the best resort, particularly when the constitution of the patient is bad.

DISLOCATION OF THE BONES OF THE FOOT.

The *astragalus* is more frequently dislocated than any bone of the tarsus; and it may either be forward or backward. Unless reduction can be effected, which is difficult, excision of the bone may be necessary, or amputation at the ankle. Dislocation of the other bones of the tarsus are usually compound injuries, and are to be treated upon general principles.

INJURIES OF THE HEAD.

THE SCALP.

Contusion of the scalp may be very severe, on account of its being stretched over the resisting bony surface of the cranium, and being frequently connected with a lacerated wound. Owing to its vascularity, great swelling will occur from extravasation of serum or blood; in many instances a fluctuating tumour being produced beneath the integuments. The swelling which results being readily depressed in the middle, may give rise to the idea of a fracture, which is to be carefully diagnosticated.

The *treatment* will require cold applications. In no instance is a coagulum of blood to be evacuated by incision or puncture; but absorption is to be promoted and depended upon, even if slow and tedious. It may be that the clot will produce inflammation and suppuration; then a free incision should be made, and the exit of

the pus favoured. Healthy granulation contracts the cavity, and the wound unites by the formation of a cicatrix.

The constitutional treatment required may be different in the early stages from the latter, being antiphlogistic or tonic, as the symptoms demand.

WOUNDS OF THE SCALP.

Simple incised wounds of the scalp give little trouble but that of hemorrhage, which is best arrested by a ligature or torsion; a curved needle will be found more convenient to secure the vessels than the tenaculum. The edges are to be drawn together by adhesive straps, in preference to stitches, on account of the danger of erysipelas. When a large portion of the scalp is lacerated, and hangs like a flap, it is not to be cut, even though it is attached by a very small process; but, after being carefully cleaned, it is to be adjusted accurately, and retained in its place by proper bandaging. It thus protects the bone from exposure, and by granulation becomes firmly united to the adjacent parts. Blindness may result from a wound upon the forehead injuring the supra-orbital nerve.

CONCUSSION.

By this is meant a jarring or shaking of the brain without any great lesion, though function is temporarily impaired; inflammation is apt to follow. The force may be directly from a blow upon the head, or indirectly, from alighting upon the feet. The patient is stunned, is somewhat insensible, lies motionless, pale and cold. Insensibility is not complete, for questions will be answered, and pain manifested by pinching; respiration is feeble, the pulse is rapid, small, and fluttering; the pupils are insensible to light, sometimes contracted, and sometimes dilated; nausea and vomiting often follow. After reaction, inflammatory symptoms commence, the pulse becomes full and hard, the skin hot and dry, the face flushed, the eyes bloodshot, great pain, especially in the head, restlessness and delirium.

Treatment.—In the first stage, that of prostration, the chief care of the surgeon is to prevent some bystander from bleeding the patient, in common with the vulgar notion. No active treatment should be resorted to until reaction has taken place. In the mean time the patient should be undressed and put to bed, and his limbs carefully examined; the head should be shaved, wounds dressed, &c.

Should the prostration continue, and danger impend from syncope, stimulation is to be resorted to in the most gradual and cautious manner; warm frictions are to be employed, small quantities of tea, wine, and water are to be administered with care, lest they pass into the air-passages, and produce asphyxia. After reaction commences, stimulants are to be suspended, lest they increase subsequent inflam-

mation. By hurrying on reaction, life is often endangered, as by the too early abstraction of blood. So soon as inflammatory symptoms fairly manifest themselves, we should endeavour to repress them by excluding all kinds of excitement, especially light and noise, and by the application of ice and evaporating lotions to the head, which should be elevated upon pillows. If great reaction occur, manifesting itself by delirium, convulsive movements, a full and active pulse, pain, &c., local and general bleeding, together with enemata and purgatives, are to be resorted to; opium will also have a beneficial influence if administered judiciously, especially in connexion with calomel and tartar emetic. For some time after the violence of the inflammation has subsided, the brain remains weak and requires watchful care; excitement, both physical and mental, is to be avoided, the diet regulated, and the head kept cool. The memory is often impaired, the conversation childish and incoherent, the eye wild and vacant in its expression, the demeanour either most timid and gentle, or entirely the reverse; occasionally one or more of the special senses, such as hearing or smell, is lost; such consequences may be temporary or permanent. The treatment most suitable is a mild mercurial course, long-continued counter-irritation, regulated diet, avoidance of all excitement and exposures to changes of weather, together with the use of the cold shower-bath.

FRACTURES OF THE CRANIUM.

These occur more frequently in adults than in children, on account of the unyielding and brittle nature of their bones, whereas the bones of a child's head are pliable, and yield to the force without fracture. Fractures of the cranium are classified, by the extent of injury, into simple fissure, stellated, depressed, and camerated fractures, fractures of the external or internal table, &c. The dangers attendant are various; there may be concussion, compression, hemorrhage, and inflammation of the brain and its membranes.

A simple fissure is of but little importance, even should it be extensive, and traverse a suture, which it often does. The fracture itself requires no treatment, unless accompanied by symptoms of concussion, compression, or inflammation.

Fracture at the base of the cranium is a very serious injury, and usually attended with laceration of the membranes, and internal hemorrhage. It is usually suspected, from the early appearance of symptoms of compression, the manner in which the injury was received, escape of blood from the ears, and sometimes from the nose and mouth. The latter symptom, although generally considered a most dangerous one, may be the result of mere laceration of the lining membrane of the ear or the nose. The treatment required will be that for inflammation or compression.

A DEPRESSED FRACTURE.

This is to be carefully diagnosticated from a fracture of the external table alone, and from a depression in the middle of a tumour occasioned by the effusion of lymph. It is dangerous, from the complications of concussion, compression, extravasation of blood, and inflammation. The treatment consists in removing the cause of compression, and combating the effects of inflammation; the former by the operation of trephining, and the latter by strict antiphlogistic means.

COMPRESSION.

Compression may be the result of extravasated blood, depression of the bone, or the formation of pus. The symptoms which characterize it are slow, laborious, stertorous respiration; a full, regular, slow pulse, and complete loss of consciousness and sensibility; the muscles are relaxed and powerless, pupils dilated and insensible, the skin warm and moist, and the sphincters often relaxed. The patient may perish immediately from coma, or may rapidly recover from the removal of the cause of depression.

Extravasation of blood may take place immediately upon the infliction of the injury, or not until reaction has followed; concussion often being produced at the same time. The extravasation may be situated between the bone and the dura mater, which is the result of a wound of the meningeal artery. This may be the result either of a direct blow, or of a counter stroke. The symptoms gradually appear, and if urgent, the trephine should be used, and the blood, if fluid, escapes at once. If the symptoms be not severe, the clot may be absorbed, and the brain gradually recover from the compression, provided high inflammatory action is prevented.

Blood may be effused within the membranes, or within the ventricles; most frequently being the result of injury to the vessels of the pia mater. The clot effused *within* the membranes is usually larger, and will produce more dangerous symptoms than one *external* to them. The most dangerous consequences result from a clot at the base of the brain.

Treatment.—The objects are to prevent increased effusion and diminish subsequent inflammation, and the removal of the clot. The head should be elevated, cups and cold applications applied, with general bloodletting and purging. The action of the heart is to be diminished, in order to prevent the further extravasation of blood. The removal of the clot is accomplished by trephining, and opening the membranes. If, however, the clot is at the base of the cranium, or it is uncertain where it may be, the membranes are not to be opened, for the chances of inflammation would be much in-

creased by the operation, and the cause of compression not certainly removed.

Compression resulting from the formation of pus, does not exhibit the ordinary symptoms rapidly, as in the case by the escape of blood, nor do the symptoms subside so readily; because pus is not so amenable to absorption as blood. It cannot be discharged but by the exfoliation of the bone, which is a tedious process. The symptoms denoting the formation of this dangerous abscess, affect the system as well as the part; and the patient would manifest the same restlessness, rigor, and fever, which attend the formation of pus in other parts of the body.

TREPHINING.

The scalp is first to be cleanly shaved; and if a wound already exist, the cranium may be exposed simply by enlarging it; but if no previous wound exist, an incision is to be made, of a crucial, triangular, or semicircular shape,—the latter being most preferred. The pericranium is then to be detached by a scraper, unless the trephine have an additional means for removing it. That portion of the cranium should be selected which is sufficiently near the injured parts to allow of elevation of the fragments, by the introduction of an elevator, and at the same time to be sufficiently firm to bear the pressure of the trephine. The sinuses of the dura mater, the occipital cross, and the course of the middle artery of the dura mater, are to be avoided. The centre-pin of the trephine is to be withdrawn after a groove is made sufficiently deep for the play of the teeth of the instrument; and great care is to be taken, lest the trephine saw through the bone unequally, owing to the want of parallelism of the two tables of the skull. The progress of the operation is to be cautiously watched, and the depth of the groove made by the trephine, ascertained by a toothpick or a small probe. The button-like portion of bone frequently comes away in the trephine; if not, it is to be removed by a forceps or elevator; the rough edges (should any exist) of the internal table, are to be taken away by an instrument called a lenticular. Through the opening thus made, the elevator may be introduced, or the extravasated blood may escape. The opening is subsequently filled up by a dense membrane, formed by the pericranium and dura mater. The edge of the opening is somewhat altered by absorption, and some deposit of bone. In some instances of compound fracture of the skull, a prominent angle may be sawed off with Hey's saw, and thus an opening be formed sufficiently large for the admission of the elevator, or the exit of the bloody clot.

INJURIES AND DISEASES OF THE FACE, NOSE, AND MOUTH.

Wounds of the face are usually attended with considerable hemorrhage, which sometimes requires the tying of an artery. Care is required to approximate the edges, in order to prevent deformity, and an ugly cicatrix. When the supra-orbital nerve is injured, vision is impaired; when the portio dura nerve is cut, paralysis of the muscles upon one side of the face results.

WOUNDS OF THE EXTERNAL EAR.

Do not affect the hearing; but when the cartilage is cut, a split will remain, unless the integuments are carefully united.

WOUNDS OF THE EYEBALL.

Produced by great violence, such as gun-shot wounds, of course destroy the sight, and are often followed by a fungous growth, which requires removal and the substitution of a glass eye.

WOUNDS OF THE TONGUE.

Bleed very copiously, and there is some difficulty in arresting hemorrhage. This is to be effected by a ligature and styptics; and, if necessary, by the actual cautery. Sutures are necessary to approximate the edges of the wound.

SALIVARY FISTULA.

This results from a wound or ulcer of Steno's duct, by which the discharge of the parotid gland opens externally on the cheek, occasioning great inconvenience and deformity, and interfering with the processes of mastication and digestion. A cure is to be effected by making an opening through the mucous membrane of the cheek, that the saliva may enter the mouth, and by closing the fistulous orifice. The edges of this orifice will require caustic, or paring with a sharp knife, or the actual cautery, to make them unite, and the internal orifice is to be kept open by a tent.

EPISTAXIS.

This implies hemorrhage from the nostril, produced by injury, plethora, or diseased state of the blood and mucous membranes. The treatment will, in a great measure, depend upon the cause. The arrest of hemorrhage by external applications, is only to be made under certain circumstances; it will be effected by an upright position, cold applied to the head and back, astringents thrown up the nostrils, and compression by lint. In some instances, the lint is to be introduced through the posterior nares, by means of Bellocque's canula, or by a flexible catheter and a piece of string, where

it must be allowed to remain for several days; in many instances, constitutional treatment is necessary.

FOREIGN BODIES IN THE NOSTRIL.

Peas, beads, and such like substances are often inserted by thoughtless children: and by unwise efforts at removal, they are more deeply lodged in the cavity. The surgeon is to inject a stream of warm water into the nose, which will wash away any coagula of blood, and loosen the foreign body; its position is to be discovered by a probe, when it can be extricated by a scooped end of a director or forceps. A pinch of snuff will sometimes dislodge it.

POLYPUS OF THE NOSE.

There are different varieties of polypi: the most common is a gelatinous, pyriform mass, attached to the mucous membrane of the turbinated bones. The patient has a sensation of a cold in the head, which is much increased in damp weather. It interferes with respiration, and frequently alters the tone of the voice. The sense of smell is also impaired, and deafness may be produced, should it occupy the orifice of the Eustachian tube. It may be removed by twisting it off by the forceps; and the hemorrhage is to be arrested by astringent injections and lint. *A dense fibrous polypus* is best removed by a ligature or wire, applied by means of a double canula, for the purpose of strangulation. *Malignant polypi* may be regarded as incurable.

LIPOMA OF THE NOSE.

Is a hypertrophied condition of the skin and fat of the apex, and alæ of the nose; seldom occurring but in aged free-livers. When the growth is large, it is to be removed by the knife.

OZÆNA.

Is an obstinate, profuse and foetid discharge from the mucous membrane of the nose, with disease of the bones beneath. The disease often extends to the frontal sinus and antrum. In adults, it is often dependent upon syphilis, or the abuse of mercury; in children, upon scrofula.

The *treatment* will in a great measure be constitutional, although benefit and comfort will be derived from the use of astringents and chlorine washes, and promoting the free discharge of the matter.

ABSCESS OF THE ANTRUM.

May result from a blow, or the irritation of a decayed tooth. It is attended with permanent, deep-seated aching of the cheek, the pain often becoming intense, together with rigors and fever. The cavity bursts, either internally or externally, which gives great re-

lief. The earlier that leeches and emollient poultices are applied, the better ; but, after the cavity has become filled with matter, there is necessity for immediate puncture just over the third molar tooth ; or, a tooth must be extracted, and a trocar pushed through the socket. The discharge of pus can be facilitated by syringing with warm water.

EPULIS.

Is a solid tumour of the gum, of a non-inflammatory character. It commences in the form of a seed-like excrescence upon the gums, between the interstices of the teeth. Being without sensibility, it may occasion but little inconvenience, except by its size. As it grows, it loses its dense fibrous structure, and may become fungous ; sometimes it becomes malignant.

Treatment.—Nothing will suffice but complete extirpation of the adjacent portion of the gum and alveolar process. Several perfectly sound teeth may have to be drawn, in order to apply a fine saw, or bone-pliers. The hemorrhage is to be arrested by muriated tincture of iron, and pressure by lint.

PARULIS.

Is a gum-boil ; occasioned usually by a decayed tooth, or a stump, or a tooth whose nervous pulp had been destroyed previous to plugging. The swelling is slow at first, though the pain is intense while the pus is forming. Unless the tooth is extracted, an opening will be formed through the alveolar process and gum, for the discharge of the matter, which may remain fistulous.

The *treatment* will consist of leeches and fomentations, and the speedy evacuation of the abscess, either by the abstraction of a tooth, or by puncture.

RANULA.

Is a sac formed beneath the tongue, by an expansion of Wharton's duct, either from disease or obstruction. Inconvenience is felt in mastication, deglutition, and articulation.

The *treatment* consists of dilatation of the duct, or making an artificial opening. It is necessary to keep the orifice distended by a tent or loop of wire, until the cyst contracts to its normal size ; otherwise it will be refilled.

WOUNDS AND AFFECTIONS OF THE THROAT.

INFLAMMATION OF THE TONSILS.

This is characterized by the rapid swelling of the part, great pain in deglutition, and fever. It is to be treated by bleeding, leeches,

purging, and gargles. An incision made with a bistoury will unload the vessels, and give exit to any pus which may have been formed.

Chronic enlargement of the tonsil may result from inflammation, especially in scrofulous persons; deglutition is impeded, the voice is rendered hoarse, respiration is noisy and laborious, and there may be deafness, from the obstruction of the Eustachian tube.

The *treatment* should consist of the internal and external use of iodine, astringent gargles, and the application of nitrate of silver. If these means fail, it should be removed by the knife, or with an instrument constructed for the purpose, such as Physick's or Fahnestock's.

ELONGATED UVULA.

This may be removed simply by a forceps and scissors.

STRICTURE OF THE ŒSOPHAGUS.

The Œsophagus may have a permanent or spasmodic stricture.

Spasmodic stricture comes on suddenly, generally at meals, and is attended with pain, and a choking sensation. It depends on a weakened or hysterical state of the system, or neuralgia. Tonics, anti-spasmodics, and alteratives are the means of cure, with proper attention to diet, and care to avoid swallowing food that is hot or imperfectly masticated.

Permanent stricture is a narrowing produced by inflammation of the mucous and cellular coats, which forms a firm ring generally opposite to the cricoid cartilage. It is most frequent in females, and has these symptoms: difficulty of swallowing, which gradually increases, and is never absent; pain in the chest and neck. It is a serious complaint, and may be followed by ulceration, salivation, vomiting of purulent matter, and death from starvation or irritation.

The *treatment* should consist of a mild course of mercury, combined with some anodyne, a seton between the shoulders, and the passage of a bougie, together with a weak solution of nitrate of silver applied to the surface.

FOREIGN BODIES IN THE ŒSOPHAGUS

Produce a sense of choking and suffocation, and may prove fatal.

Treatment.—The patient should be seated in a chair, with his head thrown back, and his mouth wide open; the surgeon should then introduce his finger, regardless of the attempts to vomit, ascertain the position of the substance, and if possible remove it by the finger, or by the assistance of curved forceps. A small sharp body, such as a fish-bone, may be got rid of by swallowing a large mouth-

ful of bread; a large soft mass, such as a piece of meat, may be pushed down into the stomach with a probang; a rough and angular body, such as a piece of bone or glass, should be brought up, if possible, by long and curved forceps, or with a piece of whalebone, armed with a flat, blunt hook, or with a skein of thread, so as to form a number of loops. If the stomach is full, it should be emptied by an emetic, with the hope that the foreign body may be ejected with the food. It may be necessary to resort to the operation of œsophagotomy, which should be performed by making an incision as nearly opposite the foreign body as possible, through the skin, platysma and fascia, and between the sterno-mastoid muscle and trachea. Care must be taken to avoid the carotid and thyroid arteries, and the recurrent nerve. A small opening should be made in the œsophagus, by cutting it upon a silver catheter, which should be passed down the throat, and made to project into the wound; the opening should be dilated, so as to prevent hemorrhage.

FOREIGN BODIES IN THE LARYNX AND TRACHEA.

Food may get into the rima glottidis, whilst a person is laughing and talking at a meal; and unless immediate relief is afforded, death will result. The surgeon may sometimes be enabled to remove it with his finger; but if not, the larynx or trachea should be opened, and a probe introduced through the wound, so as to push the foreign substance up into the mouth. A foreign body may be impacted in the ventricle of the larynx, or be loose in the trachea, producing spasmodic cough, difficulty of breathing, and pain; a small body may even pass into the bronchial tube, generally the right one. Laryngotomy, or tracheotomy, may be necessary. The *larynx* is opened by a longitudinal incision through the middle crico-thyroid ligament. The trachea is opened in the median line through the skin, fat, and fascia, at the lower portion of the neck. After the tracheal rings are made bare, the patient is directed to swallow; and while the windpipe is thus rendered tense and elongated, the scalpel is made to penetrate the lower part of the wound, with its back towards the sternum, and the rings are to be divided by cutting upwards. Care should be taken, in this operation, to avoid opening large veins, or any part of the thyroid gland. This operation is sometimes necessary for dyspnœa, when a conical curved tube should be introduced for the patient to breathe through.

WOUNDS AND AFFECTIONS OF THE NECK.

WOUNDS OF THE NECK.

Are extremely dangerous, on account of the important parts injured, and are usually the results of attempted suicide.

The *treatment* consists in arresting hemorrhage, obviating diffi-

culty of breathing, and preventing inflammation. The arteries must be rapidly yet carefully tied, and the hemorrhage of the large veins restrained by pressure. If the larynx or trachea should be wounded, subsequent inconvenience may result from the introduction of cold air, clots of blood, &c.; if the pharynx or œsophagus is wounded, the use of a tube becomes necessary, in order to convey nourishment to the stomach. This tube must be introduced through the mouth, and not through the wound, as often as it may be necessary to supply the patient with food. The edges of the wound should be carefully drawn together, and dressed in the most simple manner, and should be protected from unfavourable atmospheric influences by a covering of loose gauze, or of woollen texture thrown lightly over the neck. The patient should be carefully watched, to prevent a recurrence of the injury. A fistulous opening sometimes remains in the trachea or larynx, which is extremely difficult to heal.

BRONCHOCELE, OR GOITRE.

Is a swelling of the thyroid gland, depending, for the most part, upon hypertrophy, although a cyst may be formed, or calcareous matter deposited. In certain localities, it is an endemic disorder, and often associated with cretinism. It occurs most frequently in females after the age of puberty. It grows gradually, and without pain, occasioning inconvenience merely by its deformity and bulk. Respiration is sometimes affected, and the venous blood being prevented from returning from the head produces cerebral disorder. The cause of the disease is obscure, but probably connected with climate.

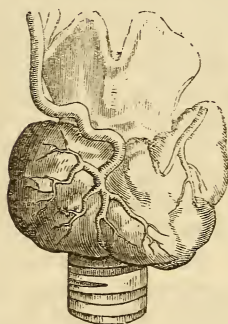
The *treatment* will consist in the use of iodine, internally and externally, with attention to the general health; or it may be necessary, under the threatening of suffocation, to perform an operation. The removal of the gland is extremely dangerous, on account of hemorrhage, and does not always produce a cure.

TORTICOLLIS, OR WRYNECK.

This is a distortion of the neck to one side, generally the result of spasm of the sterno-cleido-mastoid muscle, or by a paralysis of the muscle of the opposite side. It may also result from tumours, caries of the spine, and cicatrices, especially those from burns.

The *treatment* will vary with the causes producing it. If it result from spasm, purgatives, leeches and fomentations should be used; if from paralysis of the opposite side, general tonic treatment

Fig. 19.



and stimulating friction will be useful. If the contraction be permanent, the muscle must be divided.

INJURIES AND SURGICAL AFFECTIONS OF THE CHEST.

Wounds of the chest may be inflicted by a sharp instrument, a fractured rib, or a bullet. Danger results from hemorrhage, and subsequent inflammation from air, or clot of blood in the pleura. The intercostal may be the source of the bleeding, and it is sometimes difficult to arrest it by the ordinary means. A curved needle, armed with a ligature, is the best means of securing the vessel, when deeply concealed in the intercostal groove. The entrance of air into the chest (pneumothorax) through the wound is to be prevented as much as possible by the early and accurate closure of the wound; otherwise there may be compression of the lung. The suppuration of the wound may lead to inflammation and suppuration of the pleura. This collection of pus in the chest is called *empyema*.

When the lung is wounded, there is still greater danger from hemorrhage, inflammation, and the air. It is attended with great prostration, difficult breathing, anxiety of countenance, and expectoration of blood. The danger of bleeding results not only from the direct loss, but from its collecting in the pleura (*hæmatothorax*), and its filling up the bronchial tubes and trachea. The inflammation may subsequently destroy the lung, and the life of the patient also by hectic. The air may also more readily enter the cavity of the chest, and not being readily discharged through the external wound, may infiltrate into the subcutaneous cellular tissue.

The hemorrhage is to be controlled by venesection, rest, and other antiphlogistic means. A careful examination of the wound should be made, in order that no foreign matters remain; the patient should lie on the wounded side, so as to favour the discharge of blood or pus, and it may also be necessary to prevent a closure of the wound. *Emphysema* may be overcome by compression, or an incision.

PARACENTESIS THORACIS.

Puncture of the thorax, may be required for accumulated air, blood, or pus. The opening is most frequently for *empyema*. The point selected is usually between the sixth and seventh ribs, half way between the spine and sternum. If made too low, the diaphragm may be wounded; if too high, the fluid will not so readily escape. The opening should be closed with care, to avoid the entrance of air.

WOUNDS OF THE ABDOMEN.

Wounds of the abdomen are extremely dangerous, on account of the important viscera contained within, and the liability to peritonitis. A simple wound of the parietes must be closed by suture if it is extensive, care being taken not to include a portion of the intestine. When complicated with a wound of the liver, fatal hemorrhage must almost necessarily result, on account of the great vascularity of the organ. A patient may survive a small wound, which will be succeeded by great prostration, pain in the liver, yellowness of the skin and urine, and a bilious discharge of the wound.

The *wounds of the gall bladder, and spleen, and urinary bladder*, if communicating with the peritoneum, are almost always fatal. Wounds of the *kidney* are also exceedingly dangerous from hemorrhage, violent inflammation, and suppuration, with excessive vomiting. Venesection, laxatives, warm bath, avoidance of drinks, with light dressings of the wound, are the proper measures for treatment.

PROTRUSION OF THE BOWEL.

When a portion of the intestine protrudes through a parietal wound of the abdomen, it is to be returned with great gentleness and accuracy, so as to avoid inflammation and obscure strangulation. The edges of the wound are to be carefully approximated, by suture if necessary, and by moderate bandaging such pressure is to be made as to prevent reprotrusion.

WOUND OF THE BOWEL.

A wound of the bowel may be suspected from the passage of blood with the stools, the escape of fæces through the wound, excruciating pain over the whole belly, and a great tendency to collapse.

Extravasation into the cavity of the peritoneum does not take place from a small wound, owing to the protrusion of the mucous coat through the muscular, and the constant and equable pressure of all the abdominal viscera; lymph is also rapidly effused, and the contiguous edges are thus united. If, therefore, the protruded part be found to have sustained a mere puncture, it is to be returned as if entire. A small incision may be closed by the glover's suture; the ends are cut short, and the exudation of lymph envelopes the thread, which in time finds its way into the cavity of the bowel, and is thence discharged.

If the portion of bowel be bruised and lacerated to such an extent as to render adhesion impossible, and gangrene probable, the wounded part must be retained at the surface, and the peritoneal coat united with the integuments at one or more points; the fæces are thus dis-

charged through the external wound, and an *artificial anus* is thus established.

WOUNDS OF THE STOMACH.

Are recognised by vomiting of blood, and the nature of the matters which may escape from the wound. They are much more dangerous than those of the bowel. The edges of the stomach and the edges of the external wound are to be stitched together by the continuous suture. The subsequent treatment should consist of perfect rest, and the prevention of inflammation; venesection and leeches, and large doses of opium, will probably be necessary; nothing but thin arrow-root, or mucilage, should be given as a diet, and it may be necessary to administer this by the rectum: purgatives should be studiously avoided.

ARTIFICIAL ANUS.

This is an unnatural opening of the intestine, through which *fæces* are discharged. It may be the result of a wound, or sloughing consequent on strangulated hernia. The orifices of the upper and lower portion of the intestine are united with the abdominal wall. The lower portion of the bowel becomes contracted, and receives but little *fæces*. The integuments around the artificial opening form a funnel-shaped cavity, the edges of which are red, everted, and excoriated. The *consequences* of the affection may be inanition by the escape of chyle, especially if the upper portion of the small intestine be engaged; a patient is liable to hernia, colic, besides the disgusting annoyance of the constant escape of *fæces* and flatus.

The *treatment* will consist of regulating the bowels by diet and medicine, and by supporting the orifice by a compress or truss, which will retard the escape of the discharge, and promote the contraction and cicatrization of the funnel-shaped cavity. It may be necessary to perform Physick's operation: this consists of introducing a ligature by means of a curved needle into the orifice of the upper intestine, and bringing it out through the orifice of the lower, which ligature is then to be secured with a slip-knot. The object of this ligature is to produce adhesion between the peritoneal surfaces of the upper and lower intestine: this will require several weeks; afterwards, an opening is to be formed through this adhesion by means of a bistoury, through which the *fæces* will pass from the upper to the lower intestine, the external orifice being firmly compressed with a truss. Dupuytren operated by means of a forceps, one blade of which was inserted into the orifice of each intestine, and the pressure regulated by a screw at the handle. The effect of the pressure of the two blades of the forceps, is first to

produce adhesion between the sides of the two intestines, and by still greater pressure, to form an opening between them by ulceration.

HERNIA.

Hernia signifies a protrusion, but the term is usually limited to the protrusion of the abdominal viscera. The *predisposing* cause is a weakness of the parietes of the abdomen at the natural openings. This weakness may be increased by injury, disease, or pregnancy, and there may also exist a congenital deficiency.

The exciting causes are muscular exertion, jumping, straining, playing on wind instruments, coughing, vomiting, lifting weights, tight clothes, parturition, straining at stool, &c. *Hernia is divided*, according to the site of the protrusion, into *inguinal*, *ventro-inguinal*, *umbilical*, *ventral*, *phrenic*, *perineal*, *vaginal*, *pudendal*, *thyroideal*, and *ischiatric*. The *condition* of hernia is also a ground of division into *reducible*, *irreducible*, and *strangulated*; and if the contents of the sac be intestine, it is called *enterocele*, if it contains omentum, it is called *epiplocele*. The sac is formed of peritoneum, and the different parts are called mouth, neck, and fundus.

REDUCIBLE HERNIA.

Symptoms.—A painful swelling suddenly forms at some part of the abdominal parietes, which is compressible and soft; it can be made to disappear by pressure in the proper direction, and it often disappears spontaneously. An *enterocele* is smooth, elastic, and globular, retires suddenly, and with a gurgling noise. An *epiplocele* is more irregular in its form, has a doughy feel, and retires slowly without noise.

Treatment.—The treatment consists of reduction and retention. *Reduction* is effected by a manipulation termed *taxis*, the patient being placed in a recumbent position, and the muscles of the abdomen relaxed; gentle and steady pressure is made by the hand in the direction of the descent. *Retention* is effected by continued and suitable pressure over the site of the protrusion, by means of a truss. The points of a good truss are, a well-made elastic spring and a pad, that can be accurately fitted. The spring is to be applied two inches below the crista of the ilium, and not above it, as is frequently done. Care must be taken to prevent excoriation, and also that every portion of intestine or omentum is removed from the sac previous to its application. By constant and careful use of a truss, a radical cure may be effected in a child, but rarely, if ever, in an adult.

IRREDUCIBLE HERNIA.

When the contents of the sac cannot be restored to the abdomen, the hernia is called irreducible. It may arise from adhesions between the sac and the intestine contained, or from membranous bands stretching across the sac; from great enlargement of the omentum or intestine, or contraction of the cavity of the abdomen. The patient usually suffers from flatulence, indigestion, and constipation, owing to the peristaltic movements of the bowels being partially interrupted.

The *treatment* consists in carefully regulating the bowels, avoiding any great exertions, and the wearing of a bag truss to support the tumour, and prevent further protrusion.

STRANGULATED HERNIA.

This is an incarceration of the contents of the sac, with inflammation and an interruption to the passage of fæces and the circulation in the part. The inflammation is caused by the constriction, which may be the result of spasm, or sudden enlargement of the intestine by fæces or gas.

The *symptoms* are flatulence, constipation, pain in the part and abdomen, nausea and vomiting; sometimes the matter is stercoraceous. The countenance is pale and anxious, the skin cold and clammy, and the pulse, which was at first full, now becomes rapid and indistinct; gangrene has taken place, the pain subsides in the tumour, which feels doughy and crepitant upon being handled. The vomiting may cease, and the patient will appear more comfortable, although he is actually sinking. It may be that the integuments and coverings of the intestine may inflame and slough with the intestine; and, after a copious feculent discharge, the patient may recover by artificial anus.

When the tumour is small and recent, and the constriction tight, a few hours may produce death, if no relief is afforded; when the hernia is old and large, days may elapse.

Many of these symptoms may exist in other diseases, as in colic or ileus, but inquiry or examination should always be made as to hernia.

Treatment.—The great object is to relieve the strangulation. In the first place taxis should be resorted to, and an effort made to reduce the contents of the sac. In order to facilitate this object, bleeding, warm bath, purgatives, enemata, opium, and cold applications to the tumour will be found of use. A tobacco injection, made with ʒj to Oj of water, may be of use, but requires great caution in its use, on account of its prostrating effect. These remedies may so

relax the system that the reduction can be effected ; at any rate they will diminish the inflammation if judiciously used. If not successful, the knife must be used.

INGUINAL HERNIA.

Bubonocoele is a common name for this variety of hernia, which consists of a tumour in the groin, made by a descent of the gut or omentum through what are called the rings of the abdomen. These are the weak spots at which the protrusion takes place.

Before studying the operation for strangulated inguinal hernia, it will be proper to examine the anatomy of the parts in their natural condition, and then the varieties of the disease.

For *anatomy of inguinal hernia* refer to *Anatomy*, page 77.

Oblique, or *indirect* inguinal hernia, occurs thus:—The intestine, or omentum, first pressing against the parietal peritoneum, distends it and forms it into a sac; this sac, containing the intestine, then presses against the fascia transversalis at that portion where it is thin, and passes from the abdomen to the cord, which spot is called the internal abdominal ring, although it is not a hole. The sac, covered by the fascia transversalis, which is now thickened by pressure, then descends the inguinal canal, behind the transversalis and internal oblique muscles, and when it reaches the external ring it is covered by the cremaster, which may be considered as a continuation of these muscles; thus covered, it escapes at the external ring, and there receives an investment from the intercolumnar superficial fascia and the skin. We thus see that the intestine is covered by a representation of all the structures forming the parietes of the abdomen, with the exception of the external oblique muscle.

Direct, or *ventro-inguinal hernia*, is a protrusion at the external abdominal ring, having its coverings formed in very much the same manner as the last, but instead of the cremaster muscle forming a covering, it is covered by the expanded tendon of the internal oblique and transversalis muscles. Sometimes this tendon is split, and there is no covering representing this portion of the parietes of the abdomen. The tumour in this variety is nearer the symphysis pubis, and is on the inner side of the epigastric artery, whereas, in the indirect variety, the tumour is on the outer side of the epigastric artery.

Concealed inguinal hernia is a term applied to a protrusion which has been detained in the inguinal canal.

The *operation* for relieving the stricture in an indirect inguinal hernia is to be performed by placing the patient upon the edge of a table, with each foot resting upon a chair; the surgeon sits before him, and makes an incision extending from the upper part of the tumour nearly to its base. The skin having been divided, the superficial fascia must next be divided. This will be found to exist in the

form of laminæ, the most inferior of which is the thickest ; having been, in the natural condition of the parts, that portion of the fascia which fills up the space between the columns of the external ring,

Fig. 20.



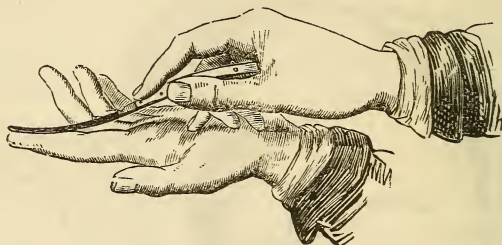
and which is sometimes called the intercolumnar fascia. After this division the cremaster muscle will be exposed, altered from its natural appearance ; the fibres being stretched and separated from each other, and being more pallid than natural. Having divided these fibres, the next covering will be the fascia transversalis, which is continued from the abdomen upon the cord ; this being done the hernial sac is then exposed.

The sac being formed of peritoneum, has been mistaken by some for the intestine, from which it is to be distinguished by not having a flexure, or crease, which the intestine always has. The sac is to be opened carefully, pinching up a part and rubbing it between the fingers, in order that no portion of intestine may be included ; a small opening is to be made, and into this a director may be introduced and the sac divided freely.

Bloody serum will escape freely, and the contents of the sac be thus exposed ; the convolution, or knuckle of intestine will vary in its colour, according to the period and intensity of its strangulation, between a light red and a deep chocolate colour ; very often the intestine will exhibit patches upon its surface when the inflammation has been intense. The finger is then to be introduced to examine the point of stricture ; if none should exist, an attempt at reduction should be made, if the intestine be in a proper condition. The stricture having been detected, a probe-pointed bistoury, with a cutting edge only near the extremity, is introduced flat upon the finger, and a slight cut made directly upwards to the extent of one or two lines. The only danger to be apprehended is the wounding of the

epigastric artery, and this is avoided by making a vertical, instead of a lateral incision. The sac may be strictured by the external or internal ring, or in the canal by the lower edge of the transversalis muscle.

Fig. 21.



The stricture being relieved, the gut is to be returned, the edges of the wound are to be carefully approximated, and a compress applied to support the part, and prevent accidental reprotrusion. A mild laxative may be given in a few hours if there is no peristaltic motion of the bowels; sometimes the bowel seems to have been paralysed by the compression, and its peristaltic action is not recovered for several hours. Danger results then from the accumulation of medicines, food, &c., and life may be lost by inflammation of the bowel subsequent to its reduction. The antiphlogistic treatment will be most serviceable. After cicatrization a truss must be worn to prevent a return of the protrusion, though occasionally the operation produces a radical cure. Such is the course of an ordinary case; but it may be found upon opening the sac, that the hernia is irreducible, owing to the intestine adhering to the sac; the stricture is to be relieved, and the wound dressed, and no attempt made to restore the intestine, unless the adhesion be recent or slight.

Should the intestine be extensively mortified it is not to be returned, the only chance of life being through the establishment of an artificial anus; but if mortified only in a few spots, the spots are to be included with a fine ligature, and the intestine returned; the ligature finds its way into the interior of the gut, and is discharged with the fæces.

In case there should be a gangrenous condition of the omentum, the gangrenous part should be cut off, and the vessels secured by fine ligatures; the remainder may then be returned to the abdomen, or be allowed to remain impacted in the outlet, and thus prevent future tendency to protrusion.

Some have successfully divided the stricture exteriorly to the sac, the sac being reduced with the hernia. The objection to this opera-

tion is the danger of there being a stricture within the sac; and if the gut should be gangrenous it will not be discovered.

Usually the cord will be found behind the sac, but sometimes it is split up, and its constituents found lying upon the sac; caution is then required to avoid wounding the artery and duct.

The operation for direct or ventro-inguinal hernia, is very much the same. There will be no cremasteric covering, but in place of it an expansion of the conjoined tendon of the internal oblique and transversalis muscles; sometimes this is wanting, owing to the tendon having been split, especially if the protrusion is sudden, and the result of great violence.

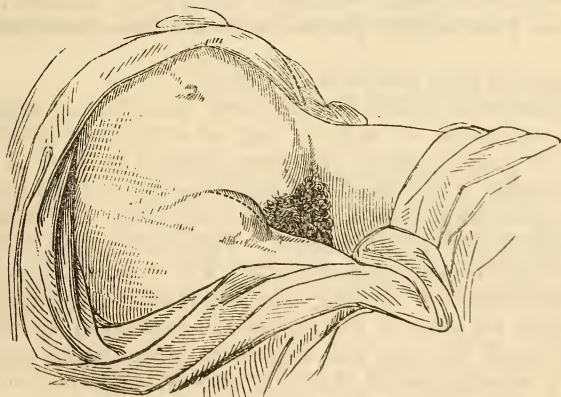
In a concealed inguinal hernia, the tendon of the external oblique must be divided, as well as the lower portion of the internal oblique and transversalis muscles.

FEMORAL HERNIA.

This is most common in women, owing to the natural form of the pelvis. The descent occurs at the *crural* ring; in order to understand which, it will be necessary to refer to the *anatomy of the part*. (See Anatomy, page 92.)

The tumour is more spheroidal usually than in inguinal hernia, and will be found to be beneath Poupart's ligament, instead of above. The fundus of the tumour is bent upon its neck, which curvature must be attended to in producing taxis. Strangulation is more common and more severe than in inguinal hernia.

Fig. 22.



The operation for the relief of stricture is thus performed. The patient being properly placed upon a table, and the parts being shaved,

the skin is pinched up and divided by transfixion, in order that there may be no injury to the important parts beneath. The wound of the skin may be crucial in shape, or resemble an inverted T.

After dividing the skin, the superficial fascia is exposed; this being divided, the fascia propria is brought in view; that fascia is sometimes much blended with the sheath of the vessels. Under the fascia propria will be found the hernial sac. It is opened in the same cautious manner as before, when a smaller quantity of fluid will escape than in inguinal hernia, and the convolution of intestine be readily recognised. The seat of stricture is then to be sought; it may be at Hey's ligament, at Gimbernat's ligament, or at the mouth of the sac. The stricture is to be divided with great care, for fear of an irregular origin of the obturator artery, the neck of the sac being surrounded by it.

The gut being returned, the after treatment will be the same as in inguinal hernia: the patient is to be kept in a recumbent position, and under antiphlogistic regimen. If there is no movement of the bowels in the course of several hours, a dose of castor oil may be given, or a mild enema may be useful; should there be inflammatory symptoms, leeches, calomel, and opium will be serviceable. Occasionally the patient is troubled with tympanites and flatulence, which will be relieved by a carminative, or enema of turpentine.

UMBILICAL HERNIA.

This is common in infants in whom the umbilicus is not consolidated. It is produced by crying; and appears as a soft, compressible tumour.

It occurs also in women who have borne many children; though in them the point of the protrusion is not through the navel, but near it.

Strangulation does not often take place.

The *treatment* in a child is simple and effective. A small hemispherical pad, made of cork, or half of a nutmeg, covered with buckskin, is properly fitted, and there secured by a broad strip of adhesive plaster, which should surround the belly of the child.

In the *adult* the tumour may become very large, and usually contains a large quantity of omentum. Pain, indigestion, and constipation are often its accompaniments. The *treatment* consists of a large truss, adapted to the case. In case it should be strangulated, the operation for relief of the stricture is performed by making an incision through the skin and superficial fascia, which exposes the sac; this is to be opened in the usual manner. The incision for the relief of the stricture is to be made in the linea alba.

OTHER VARIETIES OF HERNIA.

SCROTAL HERNIA.

Is a term applied to the protrusion of intestine when it has descended from the groin into the scrotum. It occasionally entirely obscures the penis, and reaches almost to the knees. Its coverings are those of inguinal hernia.

CONGENITAL HERNIA.

This depends upon a want of obliteration of the connexion between the peritoneum and tunica vaginalis of the testicle. The intestine descends in the same manner as the testicle. It has no sac or peritoneal covering other than that in which it and the testicle are contained.

This is most common in young male children, and is easily cured by a truss; there being a natural tendency to closure in this tubular connexion between the peritoneum and tunica vaginalis. Care should be taken in the application of the truss or compress, not to injure the spermatic cord.

In very young children a graduated compress and roller will effect a cure if properly applied.

VENTRAL HERNIA.

Is a protrusion of the intestine at any part of the belly except the navel and groin; and it may be the result of a bruise, wounds, and unnatural weakness of the muscles of the abdomen.

VAGINAL HERNIA.

Is a protrusion of the intestine into the vagina.

PERINEAL HERNIA.

When the tumour is in the perineum, having descended between the bladder and rectum.

PHRENIC OR DIAPHRAGMATIC HERNIA.

Is a protrusion through an opening of the diaphragm.

The intestine is sometimes strangulated within the cavity of the abdomen, through an opening in the mesentery, or meso-colon, or some portion of peritoneum, or peritoneal band, resulting from inflammation.

DISEASES OF THE RECTUM.

FISTULA IN ANO.

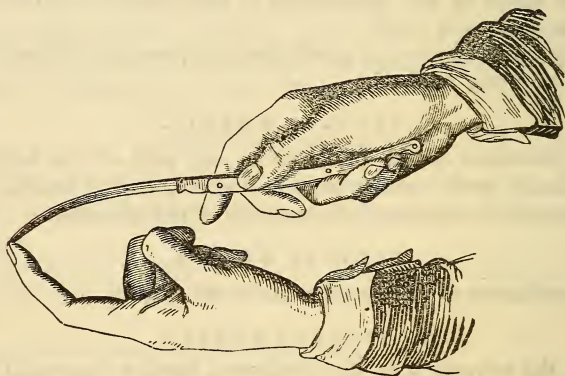
A *Fistula* is said to be *complete* when a sinus communicating with

the bowel, opens upon the nates; when it does not communicate with the bowel, but opens externally, it is called a blind external fistula; when it opens internally but not externally, it is called a blind internal fistula.

If complete, there is discharge of pus, fæces, and wind, and it is attended with heat, uneasiness, and pain. The sinus is sometimes very tortuous, and often multilocular. The internal orifice is usually about an inch and a half above the anus, but sometimes higher. The cause producing it may vary. It may originate in an inflammation of the rectum, or by an abscess external to it. It is very frequently connected with phthisis caused by the constant cough in that disease.

The *treatment* for complete fistula is generally that of the knife, the object being to place the part at rest, and convert the sinus into an open sore. The bowels having been entirely emptied, the index finger of one hand being oiled, is introduced into the rectum, and a

Fig. 23.



probe-pointed bistoury is introduced through the sinus into the gut, so that its probe touches the finger; thus kept in contact, both finger and bistoury are withdrawn, completely laying open the sinus, and dividing the sphincter ani muscle. Any bleeding vessel is to be tied; hemorrhage by oozing is to be stopped by stuffing with lint; a small portion of lint is to be placed between the lips of the wound, so as to prevent their closure; the object being to make the whole track inflame, granulate, and heal from the bottom. After the operation, a dose of morphia may be given to promote quietness and sleep; and after three or four days a dose of castor oil, which will bring away the contents of the bowel, and the dressings of the wound. Subsequently it will only be necessary to attend to cleanliness, and prevent the edges from uniting.

If the opening be very high in the rectum, it is better to use the

ligature in preference to the knife, on account of the danger of hemorrhage from the hemorrhoidal arteries. The ligature only is to be used in phthisical cases; it gradually cuts itself out, and leaves the part solid behind it. A blind fistula may be readily converted into a complete one by puncturing the intestine should it be an external fistula, or the skin in case it should be an internal one.

FISSURE OF THE ANUS.

This is an ulceration or cracking of the skin and mucous membrane, on the verge of the anus; and is attended with intense pain, especially upon going to stool. It results very often from dyspepsia, and this circumstance must materially affect the treatment. Alteratives and laxatives are necessary to bring the bowels into a healthy condition. The local applications are caustics and anodynes, such as nitrate of silver, which has a soothing as well as antiphlogistic power; opium, in the various forms of ointment, solution, and poultice. Sometimes it is necessary to excise the part, or divide the sphincter ani muscle.

HEMORRHOIDS.

Piles, or hemorrhoids, are divided into external and internal. They are more common in males than in females, and rarely occur in children. The predisposing causes are whatever tends to determine the blood to the rectum, such as constipation, pregnancy, sedentary habits; and the exciting causes may be purging, diarrhoea, &c.

EXTERNAL PILES.

Are a congeries of varicose veins, surrounded by condensed cellular tissue. In some cases, bleeding occurs from ulceration of the skin or mucous membrane covering them. When they do not bleed, they are said to be blind. When the blood has coagulated, they become hard. Usually, there is more than one.

The *palliative treatment* consists in the application of astringent and anodyne ointments, made of galls, opium, &c., and the regulation of the bowels with laxatives, such as sulphur, rye-mush with molasses, &c.

The *radical treatment* is removal by scissors or bistoury; arresting the hemorrhage, and producing a healthy ulcer. A recent tense, single pile, may be successfully cured sometimes by freely evacuating its contents by a lancet.

INTERNAL PILES.

May be of the same nature as external ones, or of a sarcomatous character; but more frequently they consist of an abnormal develop-

ment of the submucous cellular tissue, having the nature of erectile tissue; the tumour has a broad base, and its surface resembles a strawberry; at stool they protrude, and are attended with hemorrhage. The general health will suffer by emaciation, indigestion, pain, and there may result fistula, prolapsus, and disease of the genital organs.

Treatment.—In the first place, the stomach and bowels must be regulated by laxatives;—disorder of the liver must also be corrected, since any obstruction of the portal circulation in that organ predisposes to hemorrhages, or congestion of all the chylopoietic viscera; there being no valves in the veins forming the portal vein. Great benefit will result from the use of astringent injections, such as solutions of zinc, oak bark, &c.; but the radical cure consists in the removal of them, by strangulating with a ligature or wire applied by means of a double canula.

Piles should not always be cured in elderly persons, especially those with tendency to diseases of the head.

PROLAPSUS ANI.

This is an eversion and protrusion of the rectum beyond the anus, and is dependent upon relaxation.

The extent of the protrusion varies much in different cases; in some instances being confined to a small portion of the mucous membrane; in others, the rectum, and perhaps a portion of the sigmoid flexure escape. In children, worms, diarrhoea, straining, and crying, may promote the disease. In old persons, it is brought on by enlarged prostate, stone, coughing, &c. When the gut habitually descends, the tumour is red and large.

The *treatment* consists in removing the cause; in regulating the bowels, and carefully replacing the intestine after each protrusion. The evacuations should be made in the recumbent position.

The general habit should be invigorated by tonics, and the tumour should be bathed with cold astringent washes. It may be necessary to lubricate the parts before reducing them, and afterwards a T bandage should be worn, to prevent the prolapse.

In extreme cases, operations have been performed. A fold of the mucous membrane has been removed, in order to contract the intestine; and a portion of the sphincter has been cut out, in order to diminish the orifice of the anus.

ENCYSTED RECTUM.

This consists of an enlarged and diseased condition of the sacs of the mucous membrane of the rectum, just above the anus.

The *treatment* consists in drawing down the sacs with a bent probe, and excising them with a pair of scissors.

IMPERFORATE ANUS.

This is a congenital imperfection. The rectum terminates in a cul de sac, at various distances from the ordinary location of the anus; in some instances, it is so near the skin as to form a prominence, by the constant collection of fæces. In such cases, the operation is easy and simple: a free opening being made in the proper direction, with regard to the bladder or vagina, the meconium escapes, and the edges are prevented from uniting, by the interposition of a piece of lint. In other instances, it is impossible to reach the cul de sac; then it is necessary to form an artificial anus. This is done by opening the descending colon immediately under the left kidney, making the incision through the skin and fascia, so as to expose the posterior portion of the bowel, which is not covered by peritoneum at this part; a sphincter is said to be formed in the loins, though it is necessary to wear a pad.

URINARY CALCULUS.

Calculi are generally formed in the kidneys by a precipitation of earthy substances, and when they pass freely and frequently, the disease is termed *gravel*; when they are retained and become large, the disease is called *stone*.

The symptoms of stone in the kidneys are pain in the loins, irritation and retraction of the testicle, bloody urine, and inflammation of the kidney. The passage of the stone through the ureter causes most acute and severe pain in the loins and groin, faintness, and sickness of stomach, which may last for several days, and is only relieved by the stone entering the bladder.

The treatment for a *fit of the gravel*, as these attacks are called, consists in bleeding, warm bath, large doses of opium, soothing enemata, diluent and diuretic drinks, spirits of turpentine, &c. The ordinary result is the passage of the calculus; but sometimes it is retained in the kidney, increasing in size, and assuming the branching form of the pelvis, calices, and infundibula. It does not always produce inconvenience, but generally is attended with wasting of the organ, or suppuration, the abscess bursting into the colon or loins.

A small calculus, lodging in the bladder, and not being discharged through the urethra, serves as a nucleus for further deposit; any foreign body, such as a needle, drop of blood, or bullet, may serve, also, as a nucleus. The symptoms of stone in the bladder are, frequent, sudden, irresistible, unrelieved desire to make water; pain in the glans penis, and elongation of the prepuce; sudden stoppage of the stream in urination, and its re-establishment by change of position—the urine being mixed with mucus and sometimes with blood; but nothing but a sound can positively prove its

existence. Many of the symptoms are simulated by other diseases, such as stricture of the urethra, enlarged prostate, irritable bladder, &c. The rectum sympathizes, especially in children, and hemorrhoids or prolapsus ani are apt to occur. Stones vary in their form, size, colour, consistence, and chemical composition; some are rough on their surface, others smooth; they are more frequently of an oval shape. The size may be that of a pea, or that of a goose-egg. The most common colour is a light brown; some, however, are nearly white, others nearly black. Some are soft and friable, and crumble easily; others are flinty, and require great force to fracture them.

They are most generally composed of lithic or uric acid, lithate of ammonia, phosphate of lime and magnesia, oxalate of lime, and carbonate of lime. The lithic acid stones are perhaps the most common: they are oval, flattened, of a fawn-colour, and consist of concentric laminæ; the phosphatic stones are high-coloured and friable. The oxalate of lime forms the mulberry calculus, which is the hardest stone, of a very dark colour and a very rough surface. The number existing in the bladder at once, may vary from one to several hundred.

The formation of stone is consequent upon a derangement of health, deficiency of exercise, indulgence in animal food, defective condition of the skin, and dyspepsia. It is also dependent upon climate, age, locality, and hereditary influences. The immediate cause in every case cannot be discovered; some suppose that the character of the water drank influences its production. Stones are sometimes encysted in the prostate gland and urethra.

Treatment.—Gravel may be prevented or mitigated by attention to the skin and digestion, the use of acids or alkalies, dependent upon the diathesis of the patient manifesting the disease; but, after stone has been lodged in the bladder, it cannot be removed by medicines: surgical means must be resorted to.

Sounding.—This requires great tact and care in its performance, and must only be attempted when the condition of the patient is most favourable; if performed immediately after a journey, or during a fit of the gravel, the consequences might be serious. A sound is a solid steel instrument, resembling a catheter in shape, but having its curvature much nearer the extremity, and a broad flattened handle. The patient should be placed in a recumbent position, and the urine retained in the bladder for some time previous to sounding. The instrument being carefully introduced, can be moved about in the bladder, and when the stone is touched, a distinct click will be heard, and a sensible impression of impingement will be felt. There are many sources of error in sounding: the instrument may pass over the stone, when lodged in the inferior fundus of the bladder, or the stone may be small and encysted in the mucous coat; on the other hand, we may be deceived by the sound grating

against a diseased prostate or sandy matter in the urethra. In case of difficulty in detecting a stone, it is better to repeat the operation frequently, the patient being placed in different postures, than to prolong the exploration, at the risk of producing inflammation of the bladder. Having detected the stone, it is possible to form some idea of the size and number by sounding. Some have attempted the disintegration of the stone by injecting various solutions into the bladder; but the most common operations are Lithotomy, Lithotrity, and Lithotripsy.

LITHOTOMY.

This is an ancient operation, modified and improved in modern times. It is to be performed in children and in old persons, when the stone consists of the oxalate of lime, and when there is stricture, or diseased prostate.

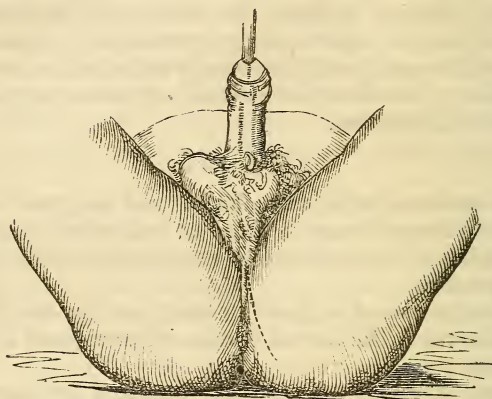
The different modes of performing the operation are the lateral, high, and bilateral. The lateral is most common, and is performed in this manner.

The patient, having been properly prepared by emptying the bowel and retaining the urine in the bladder, is placed upon a table of convenient height, and firmly bandaged hand to foot, with his knees elevated. A staff as large as the urethra will admit, and deeply grooved on the convex and left side, is then introduced. Two assistants separate the knees, so as to expose the perineum, which ought to be cleanly shaved. The patient is then to be brought to the edge of the table, and the surgeon seats himself in front with his instruments in good order, and conveniently at hand. The staff, being brought in contact with the stone, is well hooked up under the symphysis pubis, and not pressed down upon the rectum, and then given to a third assistant, who is directed to hold it vertically, and also charged with keeping the scrotum out of the way.

An incision is made with a scalpel in the direction of the dotted line of the drawing (Fig. 24), of about three inches in length, commencing about one inch behind the scrotum, and extending downwards and outwards to a point between the anus and tuberosity of the ischium, and even beyond it. Various measurements are given by different surgeons as to the point at which this is to be commenced. No well-informed surgeon should depend upon an absolute measurement, on account of the difference which exists in different patients, with reference to the size and depth of the perineum. He should inform himself of the probable size of the prostate gland by an examination per anum, and then, by his anatomical knowledge, make his incision so as to expose the membranous portion of the urethra, taking care not to cut the bulb of the corpus spongiosum in front and the rectum behind. Having cut through

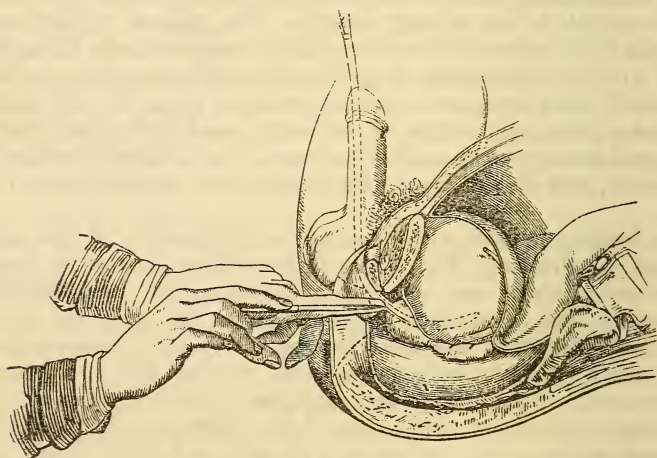
the skin and superficial fascia of the perineum, which is very thick, especially in fat persons, the transversus perinei muscle, the trans-

Fig. 24.



versus perinei artery, the lower edge of the triangular ligament, and it may be a few fibres of the levator ani muscle, must then be

Fig. 25.



divided. By an examination with the finger, the staff may now be felt in the urethra. By means of the finger and nail this space should be increased, and the urethra opened by a bistoury, which will be indicated by a flow of urine. The gorget should now be introduced into the wound, with its beak securely fixed in the groove; it is then pushed in the direction of the bladder, cutting

through its neck and prostate gland. Care must be taken to depress the handle of the gorget whilst making this thrust, for fear of wounding the rectum. Urine gushes out, the gorget is carefully removed, for fear of wounding the internal pudic artery, and the finger introduced into the bladder to discover the stone, its position, and size. A strong pair of forceps are then introduced, and the stone grasped in such a way that its short diameter shall engage in the wound, whence it is to be delivered slowly and gradually.

If it be impossible to remove the stone through this opening, it may be enlarged with care, on the same, or, if necessary, the other side. After its removal, the finger must again be introduced, to see if there is another stone.

The bladder being freed from all calculus by the forceps or syringe, a tube is introduced into the bladder through the wound, by which the urine is to escape. The patient is then put to bed, with the knees placed together. A small cup or saucer receives the urine from the tube. Severe hemorrhage may result from a wound of the bulb of the corpus spongiosum, or from cutting the urethrobulbar artery. If a ligature cannot be applied, it must be compressed by the finger as long as may be necessary.

There may also be a venous or arterial oozing, which is to be arrested by removing the tube and cramming the wound with lint, a catheter being introduced through the urethra. Should there be no hemorrhage, the tube is to remain until the wound has granulated around it, and the urine has commenced to flow from the urethra.

Some prefer to open the bladder with a scalpel, having confidence in their anatomical knowledge, and considering the gorget as a clumsy instrument, a remnant of olden times. Others use a concealed bistoury, cutting either upon one or both sides of the urethra. Besides which are various instruments, modifications of the gorget, and scalpels with beaks attached.

In four or five weeks the wound is healed.

The *high operation* is performed by making an incision through the linea alba, opening the bladder where it is not covered by peritoneum. This is only necessary where the stone is of enormous size, the prostate diseased, or the space between the tuberosities of the ischia contracted.

Stone in women, is much less frequent than in men, because the renal calculus is more readily passed by the urethra. Should it be retained, and increase in size, it may be removed by dilating the urethra sufficiently, or by the lateral operation, making the incision from the orifice of the urethra, and through the neck of the bladder. Incontinence of urine is apt to follow.

The *recto-vesical* operation consists in cutting into the bladder from the rectum.

LITHOTRITY.

Lithotrity signifies the boring or drilling the stone, and has been most successfully accomplished by Civiale. His instrument consists of a straight canula containing a drill and three claws which can be protruded after its introduction into the bladder. These claws are equally liable to catch the coats of the bladder as well as the stone, and the operation has been superseded by the following.

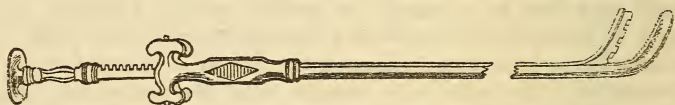
LITHOTRIPSY.

This implies the *crushing* of the stone whilst in the bladder; and it is preferred to all other operations for disintegration.

The cases most favourable for this operation are adults, where the urethra is free from stricture, the bladder free from irritability and not contracted, and the prostate not enlarged. A mulberry calculus would be unfavourable for lithotripsy, on account of its hard character.

The instrument most frequently used is that of Heurteloup, or a modification of it. It consists of two blades, which slide one upon

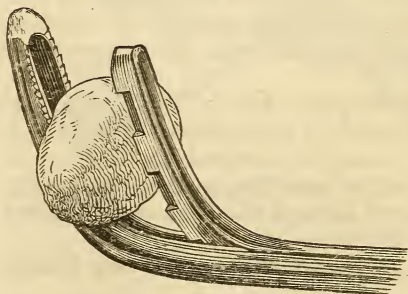
Fig. 26.



the other, the extremities being slightly bent. It can be introduced into the bladder as a sound or catheter, and afterwards the blades are separated, to grasp the stone. In the original instrument the male blade was struck with a hammer, and thus the stone was broken; now the crushing power is that of a screw, variously adapted,—that of Mr. Weiss being most simple and perfect.

The extremities of the instrument have teeth, so as to retain the stone when grasped, and also fenestræ to allow of the escape of sand or powdered stone.

Fig. 27.



The patient must be previously prepared for the operation, by regulation of the general health, dilatation of the urethra, and distension of the bladder. The patient lies on a convenient table or bed, with the pelvis elevated, so as to throw the stone into the

fundus of the bladder; the bladder must be full, so as to prevent its coats from being entangled in the instrument. If urine cannot be retained, tepid water must be injected. The instrument must be oiled and warm.

After encountering the stone and fairly grasping it, an operation which requires tact in manipulation, the stone is crushed by slowly and gradually turning the screw. Then the instrument should be withdrawn, and when the irritation has subsided, subsequently introduced to crush the fragments. Thus many operations may be required to reduce the stone into fragments sufficiently small to pass the urethra.

It is not to be expected that fragments will escape at the first urination: the after treatment should consist of diluent drinks, and bland injections to accelerate their passage; and it may be that the hip-bath, anodyne enemata, and leeches, will be required. The sources of danger are the irritability of the bladder, and urethra; inflammation often resulting from the irregularity of the fragments, and too frequent introduction of the instrument. Sometimes fragments are arrested in their passage through the urethra: a bougie or catheter should be introduced, of large size, and the fragment pushed back into the bladder: should it become impacted it may require a special instrument for its extraction, or an incision in the perineum.

Jacobson's instrument is used by many. Its extremities are connected by a link: thus a loop is formed to grasp the stone when the blades are separated in the bladder. By the operation of the screw, the female blade is pulled upon the male; whereas in *Heurte-loup's* the male is pushed upon the female,—thus there is less danger of fine fragments or sand being caught between the blades of the latter, which would impede the movement.

VENEREAL DISEASE.

The history of this disease is involved in some obscurity, although it is generally believed to have existed from the earliest ages. It consists of *Gonorrhœa* and *Syphilis*, which are usually considered as distinct diseases, although there are high authorities to the contrary.

GONORRHOEA.

Gonorrhœa is an acute inflammation of the lining membrane of the urethra, commencing in its anterior portion. It is caused by matter from another, during sexual intercourse. In about five days a discharge appears, although it may occur in a few hours, or not until ten days after coition.

Symptoms.—Heat, itching, redness of the glans, and swelling of the orifice of the urethra; the stream of urine is small and attended

with burning and smarting; the swelling, redness, and pain increase; the discharge is no longer limpid, but turbid, puriform, and profuse, sometimes being mixed with blood; the thighs, loins, testicles, and groins sympathize in a dull pain, and there may be fever. Chordee may occur, which is an intensely painful erection of the penis, which is bent like a bow, with the convexity upwards: this is owing to the corpus spongiosum being filled with lymph, which prevents its expansion by blood. It is aggravated by the warmth of the bed, and voluptuous dreams.

The glans may become excoriated; the prepuce oedematous, inducing phimosis; a sympathetic bubo may form in the groin, or an abscess in the perineum.

The joints may be painful as in rheumatism; the testicle swell and inflame, constituting orchitis, especially if the patient is imprudent in exercise, during which the discharge diminishes. As the orchitis declines, the discharge reappears.

Gonorrhœa is capable of self-cure; the symptoms gradually subsiding, and the discharge diminishing, and becoming mucous in its character: it is then a *gleet*, which is without pain, redness, &c., but which is readily rekindled into an inflammatory gonorrhœa by imprudence in diet or exercise.

Treatment.—In the earliest stage, the ectrotic or abortive plan may be pursued, if the discharge has not reached the suppurative crisis. A strong solution of nitrate of silver, used properly with a glass syringe, may cut short the disease at the outset. It should be used but once or twice, and acts by neutralizing the virus, as an antiphlogistic, and also coats the urethra with a film which protects the villous surface. This treatment often fails, especially in irritable temperaments, and when not used in the earliest stage; and if not succeeding, is followed by an aggravation of symptoms.

In the *treatment* of gonorrhœa, it is to be remembered that the first attack is generally the most severe; hence the importance of *rest*, which is seldom complied with. Low diet, purging, and tartar emetic as an antiphlogistic and antaphrodisiac; opium and camphor are also useful at night, in preventing painful erections and chordee; a warm bath is most serviceable. Mucilaginous drinks may mitigate the ardor urinæ. Leeches and ice to the perineum are sometimes very advantageous.

The discharge now must not be suddenly arrested, else by metastasis the testicle, bladder, or prostate become involved. Strong injections are very injurious, although they may temporarily arrest the discharge. As the inflammatory symptoms subside, weak astringent injections may be used with a glass syringe: sulphate of copper, zinc, alum, or iron, in the proportion of half a grain to the ounce of water.

Cubebs and *copaiba* are remedies which seem to exert a specific

influence on the urethra: the latter may be given in almost all stages of the disease; but the former should be restricted in its administration to the latter stage. These medicines often do harm, when persevered in too long, by inducing a chronic disease of the bladder, attended by a slight discharge. In the chronic stage of the disease, the discharge may be benefitted by weak solutions of nitrate of silver, and a weak solution of chloride of zinc. In a gleet, a large bougie introduced into the urethra, will often prove of immediate service.

Spurious gonorrhœa, or balanitis, is a discharge from the prepuce and glans, often induced by want of cleanliness, or gonorrhœal matter. A solution of nitrate of silver, and frequent application of cold water will cure it.

Warts are to be removed by the scissors or knife, and their bases touched with nitrate of silver, or nitric acid.

Women suffer less than men, although the vagina is involved as well as the urethra. The symptoms are the discharge, swelling, pain in micturition, sitting, and walking, aching in the back and loins.

The treatment is upon the same principles as in men; stronger injections may be used without the danger of stricture; and lint saturated with medicated solutions, retained in the vagina. Young girls suffer from spurious gonorrhœa and leucorrhœa, from which they are to be carefully distinguished. Leucorrhœa is chronic in its character from the first, attended with lassitude, pain in the back, pallor, irregular menstruation, and the urethra is not involved generally.

SYPHILIS.

This term comprises all diseases resulting from a certain virus.

Primary Symptoms.—After one or two days' incubation of the virus, the pustule forms, and the ulcer is established at the sixth day. It is first attended with redness, itching, and heat; then a vesicle appears, becomes purulent, breaks, and an ulcer is formed. This is circular or oval, excavated, and pale, with a bright red areola; the discharge is thin, ichorous, and infectious; finally, flabby granulations and cicatrization. If the virus touches an abrasion, the sore may appear at once. This sore is not to be mistaken for a common ulcer, or abrasion, or herpes. Most frequently it is situated on the collum behind the corona; the most unfavourable position is the frænum, which it often destroys.

Treatment.—If the ulcer is freely cauterized before the sixth day, the poison is destroyed, the ulcer converted into a simple one, and the system is uncontaminated. After the application of nitrate of silver, water may be used, or water medicated with aromatic wine,

or chloride of soda : granulation and cicatrization are treated as in any other case, and thus a simple venereal ulcer heals.

HUNTERIAN OR TRUE CHANCERE.

The sore is circular, much excavated, with hardened base and edges ; and the surface is of a tawny or brownish hue, covered by a thin pellicle. It occurs most frequently on the glans penis or the skin, and is usually solitary, and has no areola.

It is to be *treated* by the application of lunar caustic, and the internal administration of mercury and iodide of potash. Mercury hastens the cure of the primary sore, and affords security against secondary consequences, especially of the Hunterian chancre ; some general constitutional treatment may also be necessary. Blue pill may be given every night and morning, until the gums are slightly sore, and there is a slight increase of saliva : its action should be maintained at this point for several weeks.

PHAGEDENIC CHANCERE.

This is rapid in its progress and painful ; the surface yellow, and dotted with red streaks ; the shape irregular ; edges ragged and undermined ; their discharge is thin, profuse, and sanious. These ulcers eat deeply into the skin of the penis and surrounding parts. This chancre is apt to occur in those whose constitution is broken down with drink, debauchery, prostitution, and mercury ; mercury usually aggravates it.

Treatment.—As a local application, the nitrate of mercury is most beneficial ; the chloride of zinc is also calculated to arrest the spread of the disease. The constitution must be supported with tonics, stimulants, and good diet.

BUBO.

Bubo is an inflamed lymphatic vessel or gland leading from a venereal ulcer ; the glands may inflame from a wound of the foot or from gonorrhœa, but a real syphilitic bubo is the result of absorbed virus. Buboes vary in the rapidity of their development, and some are termed acute, others chronic ; the former hastening to suppuration, whilst the latter are indolent. If one gland only is affected, and that above Poupart's ligament, it is most probably caused by chancre, if one exist ; but if many glands are swelled, and they are below this ligament, their swelling is probably the result of irritation. Inoculation is the surest test.

Treatment.—An acute bubo will often yield to rest, leeches, fomentations, &c., but if the venereal virus shall have created pus in the interior, leeches and cold applications will rather retard the cure. Poultices, and early evacuations, are then most to be relied on. Extensive collections of pus, and sinuses, are often the result

of delay in eliminating the virus. The opening of a bubo at an early stage with a sharp lancet, even should no pus exist within, empties the congested vessels, and rather promotes a cure. Blisters and iodide of potassium will be found of use in assisting in absorption. In an indolent bubo an alterative course of mercury, and good diet are necessary.

Constitutional Symptoms.—These are secondary and tertiary.

The *secondary* symptoms speedily follow the primary, usually during the second month; consisting chiefly of general eruption, affection of the throat, fever, change of complexion, dryness of hair, rheumatic pains in shoulder and knee, headache. Different kinds of eruption follow different kinds of primary sore, although there may be irregularity in this respect. Periostitis is apt to manifest itself in the shins. Secondary symptoms are transmissible from husband to wife, wife to child, child to nurse.

Treatment.—The object is to assist nature in the elimination of the poison; hence we should not suppress the eruption, but act on the skin, kidneys, bowels, and other organs of excretion. The throat should be fomented, and touched with nitrate of silver. Mercury is not to be used if possible, especially in scrofulous, weak temperaments, or when the constitution is broken by dissipation, or the previous abuse of mercury. Small doses of corrosive sublimate, or the protiodide of mercury, is the best form of administration. But the iodide of potash is the most effective remedy in this disease. It is given in doses of 4 or 5 grains three times a day. Baths are most important; sometimes their value is increased by medicating them. Sulphur, and weak solutions of mercury seem to exercise the best influence upon the local affections of the skin.

Tertiary Symptoms.—These seldom occur, except after the worse kinds of sore, unless mercury has been rashly used. The periosteum and bones are affected by a chronic inflammatory process. Suppuration, caries, and necrosis result; also, stiff joints, tubercular formations of the skin, and condylomatous tumours. Destruction of the gums, cheeks, deafness, and iritis are also among the consequences. These symptoms are not transmissible.

Treatment.—More dependence is to be placed upon the iodide of potassium, than any single remedy. The general remedies will consist of bathing, regimen, and alteratives. Opium and blisters are necessary to relieve the pain in the bones at night.

DISEASES OF THE URINO-GENITAL ORGANS.

STRICTURE OF THE URETHRA.

SPASMODIC STRICTURE

Depends on spasm of the muscles connected with the membranous

portion of the urethra. It generally occurs in persons with some permanent obstruction; exposure to cold, and indulgence in drink also favour an attack, which usually occurs after dinner. Cantharides absorbed from blisters produces the effect.

Symptoms.—Sudden retention of urine; great straining and desire to urinate; the bladder becomes distended, the countenance anxious, the pulse quick, the skin hot; at last the bladder bursts, and extravasates into the peritoneum, or perineum.

INFLAMMATORY STRICTURE.

This is another variety of the above, generally caused by abuse of injections, exposure, or intemperance during acute gonorrhœa.

Treatment.—A catheter should be introduced at once. This is managed by introducing as large an instrument as the parts will admit of, and stretching the penis forward on the catheter, whose point at the same time should be directed towards the upper surface of the urethra, and pressed steadily, but gently, against any obstruction. Relaxation of the spasm may also be produced by bleeding, warm bath, Dover's powder, laudanum enemata, and cold water upon the genitals. Should all these means fail, and life be endangered, the bladder should be punctured from the rectum, or opened by a perineal section.

PERMANENT STRICTURE.

This is a contraction from permanent inflammation, plastic deposit having taken place in the submucous cellular tissue. The *occasion* of this inflammation may be clap, venery, kicks or blows, riding on horseback, acrid urine, drinkings, &c. The most frequent *sites* are at the commencement of the membranous portion of the urethra, and also within a few inches of the glans penis. The *extent* and *degree* of contraction vary: sometimes the stricture is very tight, but limited, as if a thread had been tied around the urethra; more frequently it is of greater extent, continuing from a quarter of an inch to several inches. Several strictures may exist at once. Behind the stricture the urethra is enlarged, and serves to catch a calculus.

Symptoms.—These come on gradually: middle-aged men are most liable. Urination is frequent, tedious, and painful: the stream is thin, twisted, or forked. After urination a few drops pass which had collected behind the stricture. Pain in the perineum, thighs, and loins; erection is often painful: semen does not escape in coition, but passes into the bladder, and afterwards is voided with the urine; chill and fever constantly occurring, as in ague: a slight discharge is visible at the end of the penis upon rising in the morning; the testicles, rectum, and bowels sympathize, and the general health fails.

Treatment.—1st. *Dilatation* by bougies of flexible metal, silver,

or gum elastic, of sufficient size, since small bougies are more apt to be entangled than large ones. The natural structures are not to be mistaken for strictures, viz., an enlarged lacuna in the fossa; spasmodic contraction of the accelerator urinæ muscle; the triangular ligament, and prostate gland. The operation must be frequent and cautious until the cure is complete, and even afterwards, to prevent return of this disease, which is not uncommon; indeed there is no certainty that it will not return. 2d. *Caustic* applied firmly to the stricture; it destroys irritability, but is more advantageous in stricture near the glans than the bladder. 3d. *Puncturation*, by means of a lanceted stilet, introduced concealed in a silver canula; after the division, a catheter is to be introduced. 4th. *Opening the urethra* through the perineum, resembling a lithotomy operation; a catheter is then introduced into the bladder, and the wound heals over it.

FISTULA IN PERINÆO.

This is usually the result of abscess of the perineum, or a wound. The patient has rigors, fever, and an exquisitely painful prominence in the perineum, which opens and discharges, much to the relief of the sufferer. The opening, however, often remains, and through it the urine dribbles. This abscess may be caused by a kick, or urinous infiltration from an internal fistula, produced by a stricture.

Treatment.—This should be directed to the cause; if a stricture exist, this should be cured first, and then the fistula, by caustic application, the application of a red-hot wire, or by paring the edges.

ENLARGED PROSTATE.

The gland is enlarged, from chronic inflammation, brought on by gleet, stricture, horse exercise, &c.; it is most common in middle life, and disappears upon the removal of the cause. Leeches, rest, counter-irritation, iodide of potash, laxatives, and enemata, are the proper treatment. But the gland is also enlarged in old persons,—a hypertrophy independent of inflammation. This enlargement takes place first in the middle lobe, and the lateral lobes enlarge unequally. The bladder sympathizes, and becomes irritable; the urine is foetid, mucous, and its stains are often retained. Catheterism, opiates, laxatives, and regimen are the palliatives.

INFLAMMATION OF THE BLADDER.

This is usually a secondary affection, usually resulting from gonorrhœa, &c. There is pain in the perineum and sacrum; mic-

turition is frequent, with straining; the urine is mixed with mucus or pus.

Treatment.—Bleeding, leeches, hip-bath, opiate enemata, castor oil, &c.

Chronic Inflammation. Catarrhus Vesicæ.—May result from the same causes as the acute form; and also from over-distension of the bladder: it is attended with great irritability and incontinence of urine. The irritability and incontinence are sometimes the most prominent symptoms; and for these symptoms the injection of a solution of sulphate of morphia, or nitrate of silver, will be found most serviceable.

ORCHITIS.

Swelled Testicle is a common accompaniment of mumps. It is often the result of an injury; but, oftener, of gonorrhœa and its treatment: exercise, wet, and cold, often induce it. Sometimes it is termed *hernia humoralis*.

Symptoms.—There is a great sense of weight, and the swelling constantly increases; the skin becomes tense, red, and glistening; the pain is intense, often producing fever and vomiting. The cord is often swollen and painful. The epididymis is chiefly affected. The urethral discharge diminishes.

Treatment.—Bleeding, in a plethoric habit; leeches, purgatives, tartar emetic, and opium; cold or warm lotions, according to the patient's feelings. Low diet and the recumbent position are essential. The weight of the tumour must be sustained by a suspensory or handkerchief. After the acute symptoms have subsided, friction with mercurial ointment, astringent lotions, and compression by adhesive straps, will be useful. In discussing the hardness and swelling which generally remain, the iodide of potash has the best effect. Abscess may result, but it oftener results from chronic inflammation or sarcocele.

Neuralgia of testes causes such severe pain that patients frequently apply to be castrated. The cause should be ascertained before treatment is commenced.

HYDROCELE.

This is a collection of serum in the tunica vaginalis testis; commencing at the lower part of the scrotum, and gradually ascending. It is smooth on its surface, fluctuating. The testicle is situated at the posterior part of the sac, near the middle. It is to be distinguished from hernia by its transparency and progress: there is no impulse upon coughing: it does not retire by recumbency.

Treatment.—The *palliative* treatment consists of evacuation of

the serum by a trocar. The *radical* cure is performed by injecting stimulating fluids, such as port wine and water, or solutions of zinc and iodine into the sac; or, by introducing a seton.

CIRSOCELE.

Varicocele or cirsocele is a varicose condition of the veins of the cord. Some restrict the term varicocele to the enlargement of the veins of the scrotum. The *causes* are such as produce obstruction to the return of blood; constipation, corpulence, tight belts around the abdomen, and warm climate. The left side is more frequently affected than the right, because the left spermatic vein is more likely to be compressed by fæces in the sigmoid flexure, and because it is longer and not so direct in its course. The swelling is pyriform, and feels like a bunch of earth-worms.

Treatment.—The disease may be palliated or cured by removing the causes, bathing the testicle in cold water constantly, and supporting it with a suspensory. The radical cure often requires an operation for obliteration of the veins,—such as the actual cautery, compression by sutures, wires, springs, &c. The scrotum may be diminished with advantage.

ANEURISM.

An aneurism is a pulsating sac, filled with blood, which communicates with an artery.

A TRUE ANEURISM.

Is the result of disease, and the sac consists of one or more of the coats of the artery. The artery may be dilated, all the coats being entire, as is usually the case in the aorta; or, the internal and middle coats may be ruptured, and the sac is formed of the external coat. The interior of the sac is lined by fibrin in a membranous form.

FALSE ANEURISM.

Is owing to a complete division of the arterial coats, either from a wound or external ulceration; the sac is formed in the cellular tissue.

DISSECTING ANEURISM.

Is a sac formed by the infiltration of blood between the coats of an artery. This sac may communicate with an artery at several points.

CIRCUMSCRIBED AND DIFFUSED ANEURISM.

Are terms used to signify its limits; whether confined to a cyst, or extending by infiltration into the surrounding tissues.

Symptoms.—The most frequent form of Aneurism is the *true circumscribed aneurism*. The tumour, at first, is small, gradually increasing, soft, and quite compressible, being only filled with fluid blood. It has a distinct pulsation from the beginning, synchronous with the heart's impulse, increased by pressure on the distal side, and diminished or arrested by pressure on the cardiac side. A peculiar thrill is imparted to the hand, which can be heard by application of the ear. At first the pain is slight, and merely owing to interference from the adjoining textures. By pressure upon the nerves a numbness is produced; pressure on the veins and lymphatics causes œdema, discoloration, and swelling. The strength of the part is much impaired, as the tumour enlarges; the circulation in the extremity is weaker; the diminished volume of the main artery is compensated by enlargement of the side channels, the collateral circulation conveying the blood from the cardiac to the distal side of the tumour. The tumour gradually becomes larger by the separation of fibrin, is less compressible, and pulsates less distinctly. The clot thus filling up the sac, restrains its further dilatation by the force of the heart. Ultimately, it may become smaller by continued absorption.

During the progress of an aneurism, adjacent parts are displaced, altered, and absorbed, even bone is rendered carious and absorbed by the constant pressure of the tumour. As the tumour enlarges, pain and numbness increase, and the general health fails. At length the tumour may burst, opening upon the skin or some important cavity, and prove fatal, either by hemorrhage, or by pressure on important parts,—as the trachea, œsophagus, &c., or by suppuration and hectic.

The diagnosis from abscesses, glands, and solid tumours is important. An aneurism is soft and compressible from the first, and then becomes hard, whereas an abscess begins with induration and ends with softening. A tumour or other swelling, receiving an impulse from lying over the track of an artery, will no longer pulsate when raised or held to one side. An aneurism expands coincidently with pulsation; a solid tumour will not alter its volume by pressure either upon the distal or cardiac side.

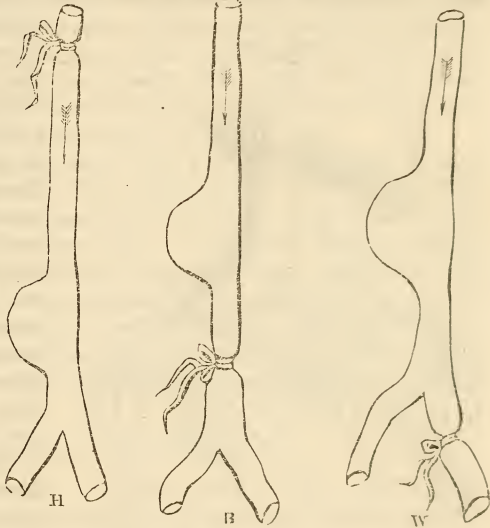
Causes.—The disease is more frequent in men than in women, and seldom occurs before puberty; the *predisposing* cause may be said to be disease of the coats of the arteries; the *exciting* causes are muscular exertion, mental emotion, and intemperance.

Cure.—This may either be spontaneous or surgical—the spontaneous being owing to pressure on the cardiac side of the tumour, occlusion of the aperture of communication, coagulation and absorption, or by inflammation from sloughing of the cyst; this however is oftener the cause of death, than a means of cure. Medical treatment may mitigate the symptoms, such as bleeding, rigid diet, horizontal position, and cold and astringent applications.

Compression is a means of cure, which is slow and painful.

The *ligature* is alone to be relied on. Previous to the time of Hunter, the vessel was tied immediately above the tumour, and the sac opened. Hunter tied the artery at a distance from the sac, in a healthy part, and allowed the sac and its contents to be absorbed; *this* is the present mode of operating. Abernethy applied two ligatures, and divided the artery between them. Brasdor's operation is directly the opposite to Hunter's, tying the artery immediately beyond the tumour. Wardrop modified this, and tied the artery

Fig. 28.



beyond the tumour and beyond its first bifurcation. The effect of a ligature is to arrest the blood and divide the internal and middle coats; a coagulum or plug is formed up to the first branch, and lymph is effused from the cut edges of these coats, and also surrounds the ligature upon the exterior of the artery. The lymph in the artery above the ligature firmly consolidates the internal and middle coats; and the cellular coat being compressed by the ligature is subsequently destroyed, and thus the ligature is removed with its noose entire; finally the portion of the artery which had been included in the ligature will be found converted into a small cord.

The ligature should be round and small, or the coats will not be divided; inclusion of cellular tissue or a nerve will also prevent this division.

Secondary hemorrhage may result from the application of an improper ligature, or its premature removal, and also from the artery being too much exposed, or in a diseased condition.

ANEURISM OF THE AORTA.

The *arch* of the aorta is especially liable to aneurism, producing difficulty of breathing, pain in the chest, and palpitation of the heart, difficulty of swallowing, and troublesome cough, owing to its pressure upon the trachea, which is sometimes perforated; it should

not be mistaken for an enlargement of the bronchial glands, or collections of serum or pus.

Aneurism of the abdominal aorta is usually situated just below the diaphragm, producing pressure on the thoracic duct, also caries of the vertebra, dropsy, and by its rupture, death.

Astley Cooper, James, and Murray have tied it without success; it should be treated only by medical means.

ANEURISM OF THE CAROTID.

This occurs most frequently in labouring people; it is situated at the angle of the jaw, near the bifurcation of the artery, and produces difficulty of swallowing and breathing; it is to be carefully

Fig. 29.



distinguished from glandular enlargement. It was first tied by Sir Astley Cooper in 1805. The operation is thus performed: the patient being recumbent, with the head thrown back, and slightly turned to the opposite side, an incision three inches in length is made along the inner border of the sternomastoid muscle, through the integuments, platysma and superficial fascia, extending from near the angle of the jaw to the cricoid cartilage.

The cross veins, descending noni nerve, and the omo-hyoid muscle should be carefully pushed aside, the sheath opened, and the aneurismal needle introduced between the artery and the internal jugular vein, which is upon the outer side; great care should also be taken not to include the par vagum nerve, which is included in the same sheath.

AXILLARY ANEURISM.

This tumour occupies the arm-pit and sometimes extends above the clavicle, producing pain and numbness in the arm. The operation of tying the artery *above the clavicle* is thus performed: the patient is placed upon a high table and the shoulder forcibly depressed; an incision (*b. fig. 29*), is made over the clavicle, through the skin and platysma myoides, reaching from the anterior edge of the trapezius to a little beyond the posterior edge of the mastoid; the cervical fascia is then divided, the external jugular vein pushed aside, and the omo-hyoid disclosed; in the triangle formed by this

muscle and the clavicle, we find the artery at the outer edge of the scalenus muscle, passing over the first rib, with the nerves forming the brachial plexus above it, and the subclavian vein somewhat in front and below. Great caution should be used in exposing the vessel, on account of the varieties of the arterial distribution in the neck; it should also be recollected the phrenic nerve descends upon the anterior face of the scalenus anticus muscle.

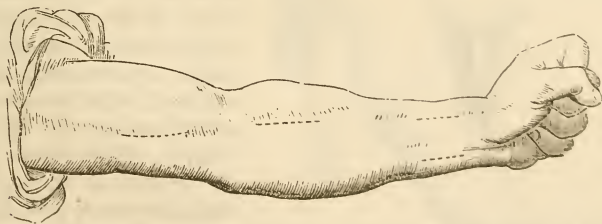
The artery is tied also below the clavicle by making a semi-circular incision, with the convexity upwards, from near the sternal end of the clavicle towards the acromial, carefully avoiding the cephalic vein and acromial thoracic artery, which pass between the outer edge of the pectoralis major muscle and the deltoid. After dividing the skin, superficial fascia, and pectoralis major, the pectoralis minor will be exposed, between the upper edge of which and the lower edge of the subclavian muscle, the artery will be found deeply imbedded in cellular tissue and fat; the vein is in front, and the axillary plexus of nerves surround the artery.

The arteria innominata has been tied, but without much success where the tumour is large. The patient lying on his back, with his shoulders raised, and the head thrown back, an incision two inches in length is made on the inner side of the sterno-cleido-mastoid, reaching to the sternum; another incision is made just above the clavicle and through the sterno-mastoid: thus a flap can be turned up; the sterno-thyroid and sterno-hyoid are then to be divided on a director, and the deep fascia exposed; cautiously opening this fascia, the vein is to be pushed aside, avoiding the par vagum, recurrent, and cardiac nerves.

BRACHIAL ANEURISM.

This is usually the result of violence, and is very often a false aneurism; the tumour is in the bend of the arm, and inconveniences its mobility.

Fig. 30.



The brachial or humeral artery is tied by making an incision on the inner edge of the biceps flexor muscle, of two inches in length, about the middle of the arm. The median nerve will be found first,

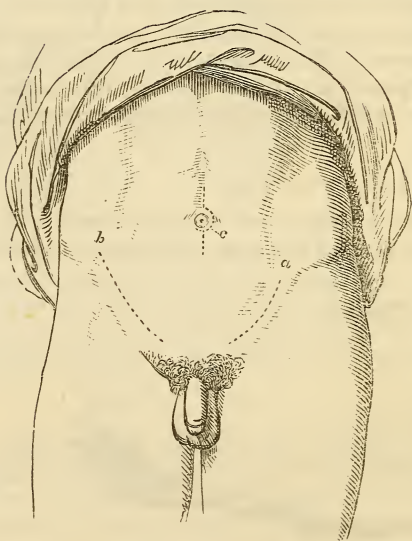
lying close to the artery; this and the veins are to be carefully separated. It must be borne in mind, that the artery may bifurcate as high as the axilla. If it be necessary to tie the artery in the upper portion of the arm, an incision is to be made over the pulsating vessel, and it will be found on the inner edge of the coracobrachialis muscle; the nerves and veins are to be carefully avoided.

Deligation of the *radial* and *ulnar* arteries is seldom required except for wounds. Often wounds in the palm of the hand require the tying of the humeral artery. The radial may be exposed in the upper part of the forearm, by an incision through the skin and superficial fascia. By separating the supinator longus muscle from the pronator teres, the artery will be found as it passes over the tendon of the pronator. In the lower part of the forearm the *radial* may be readily exposed by making an incision through the skin and fascia on the outer border of the flexor carpi radialis; and the *ulnar* by an incision on the radial side of the flexor carpi ulnaris muscle.

INGUINAL ANEURISM.

This is a pulsating tumour in the groin, not to be mistaken for a bubo, hernia, &c. The external iliac is tied by making an incision (a, Fig. 31),

Fig. 31.



about $3\frac{1}{2}$ inches in length, commencing on a level with the anterior superior spinous process, and about an inch distant from it; and continued nearly parallel with Poupart's ligament, to a point 1 inch above, and $1\frac{1}{2}$ inches to the outside of the pubes. Carefully cutting through the skin, superficial fascia, tendon of the external oblique, internal oblique, and transversalis muscles, the fascia transversalis will be exposed, with some danger of wounding the epigastric artery. This fascia should be scratched through, and the peritoneum pushed aside,

and held out of the way by an assistant with a spatula: the artery will be detected by its pulsation on the inner border of the psoas muscle, the vein being on its inner side. The operation for tying the internal iliac or the common iliac is made by making an in-

cision *b*. The letter *c* shows the incision of Sir Astley Cooper when he tied the aorta.

POPLITEAL ANEURISM.

This is of frequent occurrence, and occupies the space between the hamstrings behind the knee, causing pain, numbness and swelling of the leg, disease of the joint, &c.

The operation is to tie the femoral artery. The patient being properly placed, the sartorius muscle is rendered prominent by raising and adducting the thigh. An incision of two or three inches in length is made upon the inner side of the sartorius muscle, in the upper part of the thigh, according to Scarpa, where the artery is superficial. The saphena vein is to be regarded in the dissection of the superficial fascia. After opening the sheath, care must be taken not to injure the vein, nor to include the saphenus nerve. Hunter's operation is somewhat below, and in its performance the sartorius must be divided or pushed aside.—The *anterior tibial* artery may be tied in several places: at the upper part of the leg, by a free incision, so as to get between the *tibialis anticus* and *extensor communis digitorum*. After the division of the superficial fascia, a proper allowance should be made for the breadth of the *tibialis anticus*, in order to strike the line of division upon the dense fascia between the two muscles. The artery will be found at the bottom of this space, lying on the interosseous membrane.

At the lower part of the leg a less incision is necessary, the vessel being more superficial. The wound is made on the tibial side of

Fig. 32.

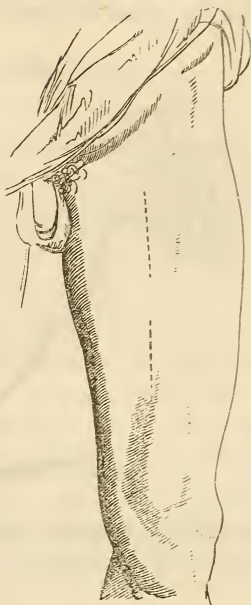


Fig. 33.

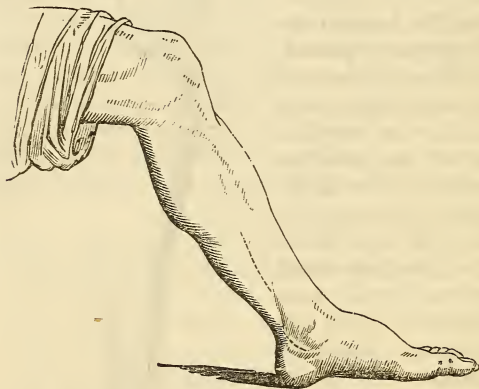


the extensor proprius pollicis. The venæ comites and anterior tibial nerve are to be avoided.

On the instep the artery may be secured by making an incision on the fibular side of the tendon of the extensor proprius pollicis.

The *posterior tibial* may be readily tied near the middle of the leg, upon the inner side; divide the skin, superficial fascia, crural fascia, and some fibres of the soleus, and the leg being flexed, the triceps suræ can be pushed aside sufficiently to expose the sheath of the vessels; the artery is to be carefully excluded from the veins and nerve.

Fig. 34.

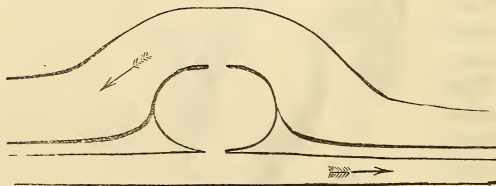


a thick aponeurosis; this exposes the sheath of the vessels. The veins and nerve are to be excluded.

VARICOSE ANEURISM.

This is usually the result of a wound, and occurs most frequently in the elbow after bleeding. An opening remains both in the artery and in the vein, and a cyst is formed with this double communication.

Fig. 35.



The arterial blood enters the vein, and produces greater or less distension of it. This enlargement of the vein is recognised by a peculiar thrill, resembling the purr of a cat: it may exist for some time with-

out any inconvenience, and is to be removed by tying the artery above and below the sac, and oftentimes it is necessary to tie the vein.

Aneurismal varix is another variety, occurring under the same circumstances, at the bend of the arm. The vein and artery com-

nunciate, as in the former, but without any cyst interposed; the swelling is less, but more diffused, and varicose distension of the veins is very great. The limb below the tumour is imperfectly supplied with arterial blood, and, consequently, cold, numb and vitally weak, and also liable to congestion and œdema. It is to be

Fig. 36.



treated by pressure, so as to repress the swelling, and moderate the sanguineous mixture: this will palliate the symptoms, and permit the use of the limb. A permanent cure can only be effected by tying the artery above and below the aperture of communication.

Aneurism by anastomosis presents itself in various forms: 1. Capillaries of a portion of integument may be equally and permanently dilated, producing discoloration and slight elevation of the part. This is one form of nævus, or congenital mark, which is attended with no danger, and may be considered as a deformity rather than as a disease. 2d. The structure may consist chiefly of dilated veins fed by arterial branches. This structure is not found in the true skin, but in the adjacent cellular tissue; or it may be submucous, as is exemplified by one variety of hemorrhoid. 3d. The swelling may consist chiefly of dilated and active arteries, supplied with large tortuous veins, which are mere conduits from the tumour; the tumour is erectile, and varies in bulk and tension, according to the state of the circulation. It often grows rapidly, and brings life into imminent peril.

Its removal may require the knife, excision, or compression.

AMPUTATION.

Amputation is not to be resorted to until all other means of cure have failed. In cases of gangrene, large malignant tumours involving a bone or a joint, diseases of the joints causing hectic and threatening life, and in case of recent injury, where reparation is impossible, then amputation must be performed.

In case of injury, amputation is either primary or secondary:

Primary; when performed immediately after the patient has recovered from the shock of the injury, and before febrile excitement.

Secondary; after suppuration has commenced, and perhaps sloughing. Secondary amputations are also performed for diseases of the bones or joints.

Primary amputations are to be performed when it is impossible to save the injured limb. In military practice, limbs are amputated for injuries, which a surgeon might attempt to save in civil practice; there

being less opportunity for treatment, and less favourable opportunity for secondary amputation.

Instruments and Dressings.—Amputating knives, catlins saw, tourniquets, scalpels, tenacula, forceps, needles, ligatures, sponges, bone-nippers, compresses, rollers, retractors, lint spread with cerate, charpie, adhesive strips, and warm water.

AMPUTATION OF THE THIGH.

The patient having been brought to the edge of the bed, his back is supported by pillows, and his hands held by assistants. The tourniquet is applied over the superficial portion of the artery, about three inches below the groin, so as to interrupt the circulation of blood in the limb. This, like other amputations, may be performed in two ways, either by the circular incision or by the flap operation.

CIRCULAR INCISION.

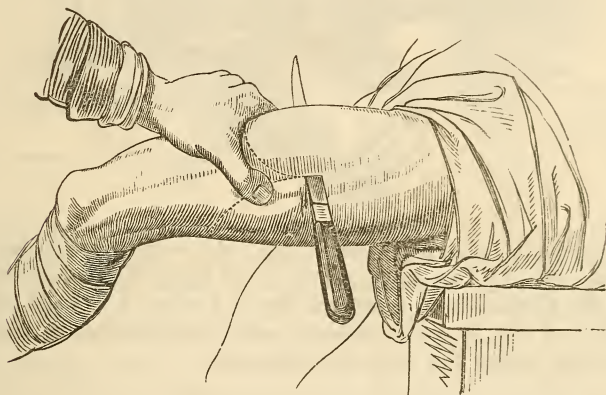
The surgeon stands so that he may use his left hand to grasp the part which he is to amputate, the leg being firmly supported, in a horizontal position, by an assistant; the surgeon then carries the amputating knife under the limb, and with one complete sweep round the limb, divides the skin, fat, and fascia. A scalpel is then used to dissect the integuments from the muscles, in order that they may be turned up, for two inches, in the same way that one would turn up the cuff of a coat. With the amputating knife, the muscles are now cut through down to the bone, the edge of the knife being inclined upwards, in order that the stump may present somewhat of a conoidal cavity; the muscles are to be slightly separated from the bone, and a retractor applied to pull them upwards. In using the saw, the heel should first be applied on the bone, and a groove made; by steady strokes the bone is divided, care being taken to prevent splintering and roughness: in case there should be any, it may be removed by bone-nippers. The large vessels can now be tied, and the stump sponged with warm water, in order to detect orifices of smaller ones. After hemorrhage is completely arrested, and the tourniquet somewhat loosened, the end of the bone is to be covered by the muscles and skin, so as to form a rounded stump; the edges are to be retained by adhesive strips, and the ligatures brought out at the corners of the wound. The stump is now covered by lint spread with cerate, and over this a thin pledget of charpie or tow; the whole is supported and covered by a roller, which should be carried once or twice around the patient's pelvis. Having been carefully placed in bed, the stump is supported upon a pillow, and secured to it by pins; over the stump is placed a frame, to take off the weight of the bedclothes. During the winter the dressings may remain on seven or eight days; in summer only two or three; a

poultice previously applied may facilitate their removal. The after-dressings may be repeated once in forty-eight hours. About the tenth day the ligatures may come away, and generally, the wound is healed in three or four weeks. Some suppose that the stump may be better covered by *flap operation*, especially should the integument be thin.

FLAP OPERATION.

The original plan of Vermale was, to introduce a knife perpendicularly to the anterior surface of the thigh, and to cut a lateral

Fig. 37.



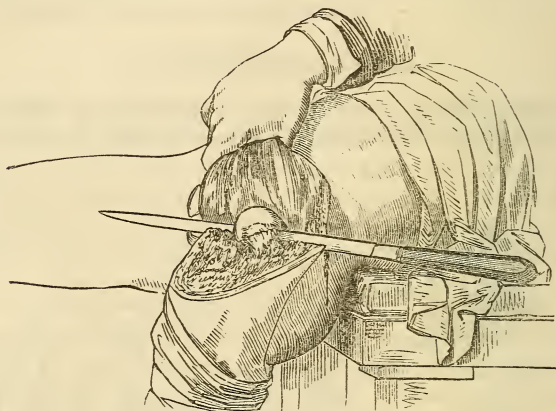
flap on either side. Liston and others prefer an anterior and posterior flap, which prevent the end of the bone rising at the upper angle of the wound, and protruding forwards. These are made by inserting the knife by the side of the thigh, as in Fig. 37, instead of upon its anterior surface. The objections to the flap operation are the injuries to vessels and nerves, by transfixion and oblique division.

AMPUTATION AT THE HIP JOINT.

This operation is rarely necessary, and is always severe and dangerous; it should never be performed for disease of the joint. The patient is to be placed on a table, with his pelvis projecting from the edge. The artery is compressed by an assistant, who must be ready to thrust his fingers in the wound formed during the formation of the anterior flap, so that he can grasp the end of the vessel, as soon as it is cut. The knife is entered about middle way between the trochanter major and the anterior superior spinous process of

the ilium. By cutting downwards, the anterior flap is formed. The head of the bone is then disarticulated, and the blade of the knife being then placed behind the bone, is carried downwards and back-

Fig. 38.



wards, so as to form a posterior flap; the vessels are to be rapidly secured, and the flap managed as in all other flap operations. By some the formation of a lateral flap is preferred. Very often the selection of the flap will depend upon the character of the wound which may render the operation necessary.

AMPUTATION OF THE LEG.

The length of the stump will, in some measure, depend upon the kind of artificial limb to be used. If the patient is to rest upon his knee, the stump should be short, in order to be bent at right angles.

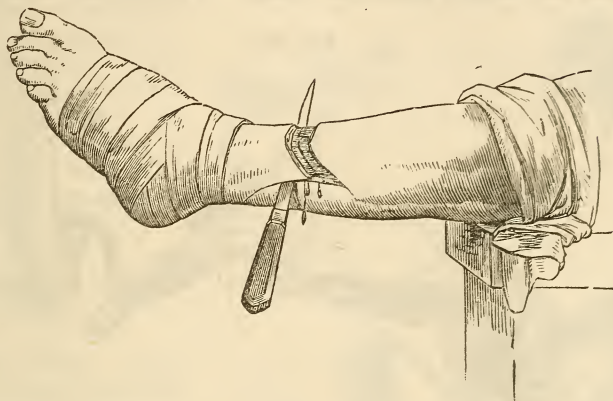
CIRCULAR METHOD.

The tourniquet having been applied, the integuments are to be divided, dissected up, and turned back for two inches; the muscles are to be divided, down to the bone, by a second circular incision. Then a catlin is to be passed between the bones, so as to divide the interosseous ligament and muscles; a three-tailed retractor is then to be applied, and the bones sawn through together. If the spine of the tibia projects much, it can be removed by a fine saw, or bone-nippers. The vessels are to be secured, and the stump treated as in amputation of the thigh, the integuments being brought together in a straight line.

FLAP OPERATION.

This is generally preferred, and is thus performed. The surgeon first places the heel of the knife on the side of the limb, farthest

Fig. 39.



from him, and draws it across the front of the limb, in a semicircular direction, making a semilunar flap. When its point has arrived at the opposite side, it is at once made to transfix the limb, and then the larger and posterior flap is cut. In transfixing the limb, care must be taken not to pass the knife between the bones. This amputation may also be performed near the ankle; but, in this instance, it will be necessary to shorten the tendo Achillis after the flap is made. The leg should not be amputated nearer the knee than the tuberosity of the tibia, or the joint will be opened, and inflammation result. Hence *amputation at the knee* is rarely performed, although disarticulation may be readily performed with a large scalpel. In this operation the patella should be allowed to remain.

AMPUTATION OF THE FOOT.

The foot is amputated at two places.

CHOPART'S OPERATION.

A flap is made from the upper part of the instep, and the disarticulation commenced immediately behind the tuberosity of the scaphoid bone. The bistoury is passed between the scaphoid and head of the astragalus, and then between the cuboid and os calcis: an inferior flap is then made from the sole of the foot.

HEY'S OPERATION.

The disarticulation is commenced immediately behind the tuberosity of the fifth metatarsal bone; separating the fifth and fourth metatarsal bones from the cuboid, the third and second from the external and middle cuneiform bones. The internal cuneiform is

Fig. 40.



either removed or sawed through. The superior flap is made before the disarticulation, and the inferior one subsequently.

AMPUTATION OF THE GREAT TOE.

The most convenient mode of removing this toe is by incisions represented by dotted lines in this figure. Commencing upon the inner side of the metatarsal bone, and running round the joint obliquely, taking care not to wound the anterior tibial artery. The flap is made from the outer side of the toe. It will cover the head of the metatarsal bone more perfectly, and can be more readily retained in its position than any other.

Fig. 41.



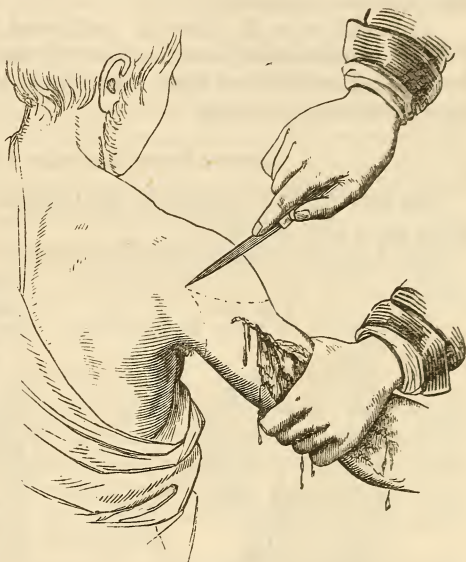
AMPUTATION AT THE SHOULDER JOINT.

Hemorrhage is to be restrained by pressure with the fingers, or the handle of a key well padded, upon the subclavian artery, as it passes over the first rib. The flaps may be cut by transfixion, or in the manner represented

in Fig. 42. The external flap should be made first, out of the deltoid, and then the head of the bone disarticulated. The internal flap is smaller, and made last, in order that the vessel may be secured immediately upon the limb being severed.

In some instances it may be necessary to remove the whole of the scapula, and one half of the clavicle. The extent and character of the injury must often determine the shape of the flaps.

Fig. 42.



AMPUTATION OF THE ARM.

The circular operation is most frequently performed. The artery is compressed by a tourniquet or the fingers, and the skin drawn firmly back. One circular incision will divide the skin and fascia; another will divide the muscles.

If the knife is held so that the edge is

Fig. 43.



directed slightly toward the shoulder, the end of the bone will be found in a conical cavity, and can be well covered by the muscles and skin.

The flap operation is sometimes performed. The arm being transfixed, the anterior flap is made first; the vessels are divided when the posterior flap is cut.

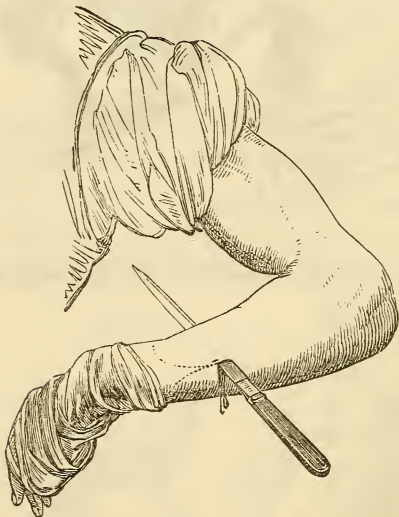
Amputation at the elbow is performed by making a single flap from the muscles and skin in front of the joint. The head of the radius is disarticulated first: the ulna is then to be sawed, so as to let the olecranon remain.

AMPUTATION OF THE FOREARM.

The tourniquet is applied to the brachial artery as in other operations upon this extremity.

Two flaps are formed, one on the dorsal, the other on the palmar aspect. These are best made by transfixing and cutting outwards.

Fig. 44.



The amputation should be performed as near the wrist as circumstances will admit of; although below the middle it is not easy to obtain sufficiency of flaps. But, the general rule is, to remove as little as possible from the organs of prehension: and operations are attended with less risk to life the farther they are removed from the trunk.

AMPUTATION AT THE WRIST.

The disarticulation of the radio-carpal joint is readily effected by commencing at the styloid process of the radius. A dorsal and palmar flap is made of the skin. The pisiform bone is to be allowed to remain.

AMPUTATION OF THE FINGERS.

The hemorrhage may be controlled by an assistant's grasping the wrist tightly. The finger may be amputated at a joint or in the middle of a phalanx, though it is important to save as much as possible. The operation may be circular, or with a flap, which should be made from the palmar aspect of the finger.

C A N C E R.

Malignant diseases change the original structure of the part, transform or destroy the surrounding tissues, travel in the course of the lymphatics, contaminate the nearest glands, affect several organs in the same individual, and, if mechanically removed, reappear in or near the cicatrix.

Malignant growths contain granules or nucleated cells, imbedded in a fibro-cellular tissue. They are *composed* almost entirely of albumen. Their *development* is dependent upon perverted nutrition. The *causes* are perpetual local irritation, and a morbid state of the constitution, which may be hereditary. In the ordinary sense of the word they are not contagious; but cancer-cells injected into the blood of a dog, produce malignant disease of the lungs.

Cancer is a term applied to several kinds of malignant disease; and under this term are included several morbid growths, *encephaloid*, *schirrhus*, and *colloid*, whose physical characters are so various that they have formerly been considered as separate affections.

ENCEPHALOID.

This is often called Medullary Sarcoma, Soft Cancer, and Cephaloma. The word Encephaloid is preferred because it denotes the resemblance which the morbid product bears to the brain in colour, texture, and consistence. The tumour is highly vascular, which in some measure accounts for the rapidity of growth and the great size to which tumours of this kind attain.

The skin investing the tumour is pale, with numerous veins coursing beneath it. At first it is moveable on the tumour, but afterwards ultimately incorporated therewith. The growth is not circumscribed and moveable, but fixed and diffused into the surrounding parts. To the touch a sense of great elasticity is imparted, different from the fluctuation of chronic abscess, and different also from the semi-fluctuation which the fatty tumour exhibits, yet somewhat resembling both.

Pain is almost always considerable, often severe and shooting. In some cases it is at first absent; and then the tumour is usually of slow growth, but when it enlarges in the ordinary manner, as it soon does, the pain becomes developed, and continues. The patient is obviously cachectic, and bears on his countenance a plain token of a formidable disease; the features are shrunk and anxious, the hue is sallow, emaciation is begun, the functions of animal life are all disturbed, and hectic is setting in. It attacks more frequently young persons, and may occur in any texture, though most commonly it affects the orbit, testicle, mamma, joints, internal viscera, and lymphatic ganglia.

The section of an encephaloid mass, when fully developed, presents the appearance of an almost homogeneous matter, of an opaque

milky colour, ordinarily dotted with spots of pinkish hue, varying in different specimens in number, size, and shape. In consistence it closely resembles the healthy brain of an adult, and may be broken up between the fingers with about the same facility as the substance of that organ; if torn through, the lacerated surface presents a coarsely-granular aspect. Sometimes it is divided into lobules by fibrous bands intersecting the mass; and in tumours of considerable duration, softening will occur, and the skin will give way. So long as the tumour is invested by the integument, it is said to be *occult*; when the skin has given way, and the morbid structure consequently becomes exposed, it is said to be in the *open state*. During the softening of encephaloid, the vessels become opened, the effused blood more readily enters the soft tissue, and mixes with it, than in the harder sorts of cancer; the whole mass assumes a sanguineous appearance, and in this way encephaloid merges into *Fungus Hæmatodes*. Black granular pigment may likewise enter into the composition of encephaloid, forming *Melanosis*.

There are certain forms of cancer-cells which are characteristic of encephaloid, for instance, parent-cells with young cells in their interior, cells with numerous cytoblasts, and the irregular caudate and ramifying cells. Of all forms of cancer, encephaloid runs the quickest course, is the most malignant, and causes death in much the shortest time.

SCHIRRUS.

Schirrus usually forms a roundish tumour with a more or less nodulated surface. Its consistence is generally very firm; the tumour in this respect resembling cartilage or even stone; this hardness depends on its fibrous structure, and varies with the toughness, compactness, and amorphous character of the fibres. Its nodules, in cases where the tumour is superficial, are frequently observed on the application of the hand, to be of a lower temperature than the surrounding parts; this is probably dependent on the limited supply of blood to the part. It is much less vascular, and of much slower growth than encephaloid; softening does not take place as rapidly, and, until this occurs, the life of the patient is comparatively safe. A section of one of these tumours sometimes appears of a bluish-white or milky colour, resembling other fibrous tumours; sometimes it presents a more opaque appearance, and is tinged with yellow or red; when softening has commenced a caseous appearance is presented. As a general rule, schirrus is intimately blended with the surrounding parts, not being enclosed in a capsule, or presenting a definite border. Schirrus has a constant tendency to transition into encephaloid or colloid. The mutual relations between the fibres and the cancer-cells vary extremely in schirrus; so

much so, that it is frequently impossible to distinguish some parts of the tumour from encephaloid, and others from fibrous tumour. The cells are small, round or oval, and granular. Schirrus contains a viscid fluid, which, when it occurs in excess, forms the transition to gelatinous cancer. The pain is at first slight, and gradually increases as the disease progresses. It occurs more frequently in women, and attacks the mammary gland, generally after middle life.

COLLOID.

This variety of cancer consists of a jelly-like matter, enclosed in cellular cavities, varying from the size of a pin's head to that of an egg; the walls of these cavities are composed of fibrous tissue, such as occurs in schirrus, and the jelly is colourless and transparent, containing pale cells, which differ from true cancer-cells, being, generally speaking, larger, more delicate, and the walls not being so thick. No true softening or suppuration occurs in this form of cancer; in the intestinal canal, where it is most frequent, the surrounding tissues become gradually infiltrated with this jelly; strictures are thus formed in the gut, and the contents of the canal being pressed on by the soft gelatinous mass, give rise to perforation of the walls. Hence gelatinous cancer is in some degree different in its progress from the other forms of carcinoma.

Treatment.—The treatment of any form of cancer will, in a great measure, depend upon the development of the disease. A small tumour of a schirrous form may be extirpated, with some chance of success, though not with certainty as to its non-reappearance. When the cancer is open and ulcerated, the treatment should be directed to the constitution, which will, sooner or later, sink with symptoms of hectic.

CLUB-FOOT.

This deformity may be either congenital or acquired. The congenital form is dependent upon some disturbance of the cerebro-spinal system, that produces irregular contraction of the muscles, by which antagonism is destroyed.

The accidental causes by which it may be acquired, are injuries and diseases of the foot or ankle, convulsions, scarlet fever, cicatrices, rickets, &c.

The principal varieties are three:—1. *Talipes Varus*, in which the foot is turned inward, as in Fig. 45, and rests upon its outer edge. There are various grades and modifications of varus. The foot is not dislocated, but the bones deviate from their normal direction, and their articular surfaces are partially separated. The astragalus is least altered in position. The ligaments on the outer side are lengthened, and those on the inner are shortened. The ten-

dons of the *tibialis anticus* and *posticus*, and the *tendo Achillis*, are most contracted; the *peronei* muscles are relaxed.

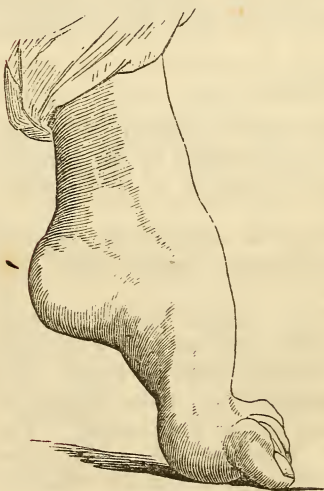
Fig. 45.



2. *Talipes Valgus*. The foot is everted, and rests on its inner edge. It is a rare form of club-foot. The ligaments on the inner side are relaxed. The *peronei* muscles are contracted, and the *tibialis anticus* and *posticus* elongated.

3. *Talipes Equinus*.—In this variety the foot rests upon the ball, or upon the toes. After a person has walked for a number of years the deformity is increased, as is represented in the drawing (Fig. 46). The shortening is due to contraction of the *triceps tendon*, and thickening of the *plantar fascia*.

Fig. 46.



There are two other varieties; one in which the toes are drawn up by contraction of the *extensors*, and the patient walks upon the heel; and the other when the *dorsum* or instep comes in contact with the ground. Besides which there may be various complications of the above.

The *prognosis* will depend upon the degree of contraction, the variety of the deformity, the condition of the bones, and the age of the patient.

Treatment.—Many cases of congenital club foot may be rectified by constantly wearing a proper apparatus, especially if the treatment be commenced in early childhood; but in confirmed cases it is

better to resort at once to Stromeyer's operation of division of the tendons. The operation is thus performed.

The tendon is put on the stretch, and a narrow, sharp-pointed knife is thrust through the skin externally to the tendon; then the edge is directed towards the tendon and the knife withdrawn, cutting the tendon as it escapes.

The operation will facilitate the cure in most cases, provided the subsequent treatment be effectually maintained; and this depends as much upon the fidelity of the parent or nurse in the constant application of the apparatus as upon the skill of the surgeon.

There may be said to be little or no danger resulting from the operation.

Various foot-boards and shoes are to be worn, by which the deformity is gradually and permanently overcome.

The most favourable period for the operation is between six and eighteen months. Great care is required not to produce excoriation and ulceration of the skin in a young child. Oftentimes it is better to remove the apparatus entirely than run the risk of producing fever or convulsions.

AFFECTIONS OF THE EYE.

DISEASES OF THE EYELIDS.

HORDEOLUM, OR STYE,

Is a small painful boil, in the cellular tissue upon the edge of the eyelids. Some suppose that it originates in the sebaceous glands at the roots of the cilia, or in the follicles of the ciliæ. A scrofulous constitution predisposes to the occurrence of them.

Treatment.—Those who are liable to them should pay attention to the condition of the stomach and bowels. Cold applications and nitrate of silver may arrest it; but generally it suppurates, requiring poulticing and puncturing.

OPHTHALMIA TARSI.

This is a chronic inflammation of the edges of the eyelids, occurring most frequently in scrofulous children. The edges are swollen and red; the eyelashes loaded with Meibomian secretion; and the lids are glued together in the morning. There is itching, smarting, and a sensation of stiffness. When the disease is of long standing, the eyelashes fall out, and the new ones are misdirected, and irritate the conjunctiva. In adults it may be the result of catarrhal ophthalmia, or be produced by cold and damp air, or by intemperance. In children it may be the result of eruptive diseases.

Treatment.—Alteratives, laxatives, and tonics. The state of the skin requires attention. Fomentation will remove the incrustations

Loose and misdirected eyelashes are to be removed. An ointment composed of gr. x. of red precip. and an ounce of cerate is to be carefully applied at night; and in the morning the lids are to be bathed with tepid water, and not separated forcibly. In inveterate cases, sulphate of copper and nitrate of silver may be applied to the edges, in case the conjunctiva is thickened; and blisters may be placed behind the ears.

ENTROPION

Is a permanent inversion of the eyelid, and often results from tarsal ophthalmia, from a relaxation of the integuments of the eyelid and spasmodic contraction of orbicularis palpebrarum muscle when long continued, or by contraction of the conjunctiva; constant pain and irritation follow from the ciliæ rubbing against the ball. It is to be distinguished from *trichiasis*, in which the ciliæ are inverted, and irritate the ball whilst the lids remain in their natural position.

The only treatment which can be of permanent benefit, is the excision of a fold of skin, from near the edge of the eyelid; but this is only applicable in certain cases where the cause is relaxation of the skin.

ECTROPION

Is an eversion of the eyelid, caused often by a thickening of the conjunctiva from long inflammation, or from cicatrices upon the skin of the eyelid, resulting from a blow or burn. This is to be cured by bringing the conjunctiva to a healthy condition, by the application of nitrate of silver or sulphate of copper. Should these remedies fail, a portion of the conjunctiva is to be excised, or a portion of new skin to be substituted for the cicatrix.

PTOSIS

Is a falling of the upper eyelid, from a palsy of the third nerve, or from an injury of the levator palpebræ superioris muscle. It is often connected with congestion of the head, and may be a precursor of apoplexy, and should be treated by bleeding, purgatives, mercury, and blisters. If persistent, it may be obviated by removing a fold of the skin from the upper eyelid.

DISEASES OF THE LACHRYMAL APPARATUS.

XEROPHTHALMIA

Is a dryness of the eye, arising either from a want of secretion of the conjunctiva, or, as some suppose, from a deficiency of tears. It is to be remedied by frequently bathing the eye with mucilage.

EPIPHORA

Is a superabundance of tears, so that they run over the cheeks : it should be distinguished from *stillicidium lachrymarum*, which is an overflow in consequence of an obstruction of the channels that convey them to the nose. It arises frequently from scrofulous inflammation ; or from the action of chemical or mechanical agents, cold winds, acrid vapours, &c. The treatment will, of course, vary with the cause.

OBSTRUCTION OF THE LACHRYMAL DUCT

Is known by the overflow of the tears, the dryness of the nostril, distension of the sac, and the formation of a small tumour. It often leads to inflammation and abscess. In other instances, it results in thickening of the tubes and duct, which may be much benefitted by the use of probes. The puncta and canaliculi may be dilated sufficiently to admit a probe of the same thickness as the ordinary style.

FISTULA LACHRYMALIS

Is an aperture at the inner corner of the eye, the result of a bursting of an abscess caused by obstruction. The inflammation of the sac is to be treated by leeches and cold applications. If suppuration cannot be obviated, the tumour is to be opened as soon as it has become soft and fluctuating. The opening should be made parallel to the margin of the orbit, and below the tendon of the orbicularis. The sac should then be fomented and thoroughly cleansed, and after a few days, should any doubt exist with reference to the perviousness of the tubes and sac, an exploration is to be made by probes.

Should the obstruction be firm, the opening into the sac will remain fistulous, and then a *style* must be introduced. The object of the style is to dilate the strictured portion of the sac. The form and size is represented in the cut. They are usually made of lead, silver, or gold, and sometimes of catgut. Some have thought best that there should be a groove on the style, or that it should be hollow, but this is unnecessary ; for although the style may occupy the whole of the calibre of the

Fig. 47.

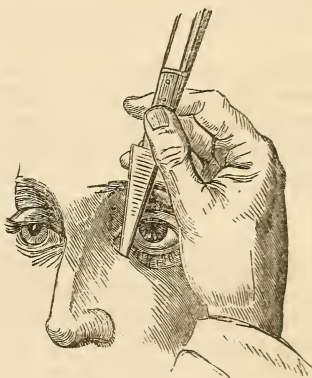


Fig. 48. Fig. 49.



duct when first introduced, the tears gradually widen it and flow readily by the side of it.

DISEASES OF THE CONJUNCTIVA.

ACUTE CONJUNCTIVITIS.

Symptoms.—Smarting, heat, stiffness, with a feeling as if dust had got into the eye. Subsequently the secretion of mucus increases; which becomes puriform. The vessels of the conjunctiva are turgid and numerous, giving it a bright-red appearance. There is slight intolerance of light and increased flow of tears.

Causes.—Cold or damp, bad condition of stomach, or local irritation.

Treatment.—A dose of calomel followed by a saline cathartic; leeches, cold applications, moderately dark room, and a solution of nitrate of silver. The disease may become *chronic*; when blisters behind the ear, and astringent applications to the eye will be useful.

PURULENT CONJUNCTIVITIS.

This, and *Egyptian ophthalmia*, are more severe forms of the same affection, and are infective. The most severe form of inflammation of the conjunctiva is *gonorrhœal ophthalmia*; in this variety the eye is often lost. The treatment must be early and active.

SCROFULOUS CONJUNCTIVITIS.

Symptoms.—Extreme intolerance of light, the eyelids are spasmodically contracted, the head is turned away from the light, there is no general vascularity of the conjunctiva, but a few vessels running towards the cornea, terminate in phlyctenulæ, or pustules on the cornea. This disease is most obstinate and liable to perpetual recurrence, often resulting in ulceration of the cornea, or opacity from effusion of lymph between its layers.

Treatment.—Local applications are of no avail unless the general health be improved. A dose of calomel and rhubarb should be followed by tonics and alkalies, and other general remedies for scrofula, such as quinine and salt baths. The nitrate of silver exercises a more sedative and antiphlogistic influence than any other local remedy.

GRANULAR CONJUNCTIVITIS

Is a thick, rough, fleshy state of the palpebral conjunctiva, dependent upon long-continued inflammation; it causes great pain and disturbance to the motion of the eye, and if it continues will render

the cornea opaque by its friction. These granulations are dependent upon a hypertrophy of the papillæ of the palpebral conjunctiva, and a thickening of their epithelium.

Treatment.—If the granulations are long, they may be removed by the knife or scissors; ordinarily they can be cured by scarification, lunar caustic, and sulphate of copper; at the same time the general health must be attended to, and blisters may be applied behind the ears.

ULCER OF THE CORNEA.

This most frequently occurs as a result of conjunctivitis, especially of the scrofulous form, but may arise from mechanical injury; it often penetrates the cornea and leaves an opaque cicatrix. When the ulcer is *healthy*, its surface is somewhat opaque, owing to the effusion of lymph; when *inflamed*, vessels will be found approaching it; when *indolent*, it is clear, and transparent, appearing as if a small piece had been cut out of the cornea. The nitrate of silver is the best application to the inflamed and indolent ulcer of the cornea. If the acetate of lead be used, a white precipitate is formed, which is liable to become fixed in the cicatrix as a dead-white spot.

SCLEROTITIS.

This disease is often called rheumatic ophthalmia. It is known by redness of the sclerotica, slight intolerance of light, severe aching pain of the eye and the bone surrounding it, which is aggravated at night. It is distinguished from conjunctivitis by the character of the pain, and redness. In *sclerotitis* the vessels are deep-seated, of a pale pink colour, and run in straight lines from the circumference of the eye towards the cornea; whereas in *conjunctivitis*, the vessels are tortuous, freely anastomose, superficial, and are of a bright-red colour.

Treatment.—Bleeding, purging, together with the administration of colchicum, warm baths, and anodyne fomentations; blisters behind the ears, and Dover's powder, are also of great avail.

IRITIS.

This often is *caused* by injury or cold, but oftener by scrofulous, syphilitic, or gouty taint.

Symptoms.—The iris changes in colour; appears rough or villous; the pupil is contracted, and often filled with lymph; a pink zone surrounds the cornea, formed by small vessels from the sclerotica; there is intolerance of light, dimness of vision, a burning pain in the eye, and an aching pain over the brow.

Treatment.—The inflammation should be subdued by active an-

tiphlogistic means, such as bleeding, purging, and leeching. The absorption of lymph is to be promoted, and its fresh effusion arrested by the administration of small doses of calomel and opium every four hours, until the gums become affected. The pupil should be kept well dilated by belladonna or stramonium, and the pain must be relieved by anodyne fomentations and nightly doses of opium.

Artificial Pupil.—It is often necessary to form a new aperture in the iris, owing to the pupil having been obliterated by inflammation.

CATARACT

Is an opacity of the lens or its capsules. It may be caused by inflammation or injury, but is more frequently the result of impaired nutrition. There are different varieties of cataract, designated by the terms hard, soft, radiated, capsular, &c.

Symptoms.—The vision becomes gradually impaired, and objects appear as if surrounded by a mist or cloud. The sight is better in the evening, or after the application of belladonna, because the pupil being dilated, more light passes through that part of the lens which may yet be transparent. The pupil is active, and behind it is an opaque body of a grayish-white or amber colour. The catoptric test is the most certain mode of distinguishing it from amaurosis and glaucoma. When a lighted candle is held before the healthy or amaurotic eye, three images of it may be seen: an erect image, that moves upwards when the candle is moved upwards, which is produced by reflection from the surface of the cornea; another erect image, produced by reflection from the anterior surface of the lens, which also moves upwards when the candle moves upwards; and a very small inverted image, that is reflected from the posterior surface of the crystalline, that moves downwards when the candle is moved upwards. In cataract, this inverted image is from the first rendered indistinct, and soon abolished; and the deep erect one is soon abolished also.

Treatment.—There is no cure but by an operation, which should be deferred until the patient is in good health and condition. If the iris moves freely, and there is no tendency to vascular disturbance in the eye or head, the chances are favourable.—There are three modes of operating, before performing either of which the pupil should be dilated by belladonna or stramonium.

Extraction.—An incision is made through one half of the circumference of the cornea, the capsule of the lens lacerated, and the cataract extracted entire.

Couching or Depression.—The object of this operation is to remove the cataract from the axis of the vision, and is performed by a couching needle passed through the outer side of the sclerotica, about two lines from the margin of the cornea.

Producing Absorption.—The needle is introduced in the same

manner as in depression, the lens broken up and subjected to the absorbent influence of the aqueous humour.

AMAUROSIS

Is an imperfection of vision, arising from some change in the retina, optic nerve, brain, or fifth pair of nerves.

Symptoms.—The sight is impaired by degrees; at times vision is more impaired than at others; objects appear double, crooked, or discoloured; black spots or flashes of light, a vacant stare, dilated pupil, and but little motion of the eyelids, indicate amaurosis. There is often a want of the natural colour of the pupil, which may cause it to be mistaken for cataract, from which it is most certain to be distinguished by the catoptric test, as well as by rational signs. The usual causes are circumstances which over-stimulate the retina, such as glaring lights, heats, intemperance, tight neck-cloths; also inflammation, concussion, extravasations, tumours, &c.

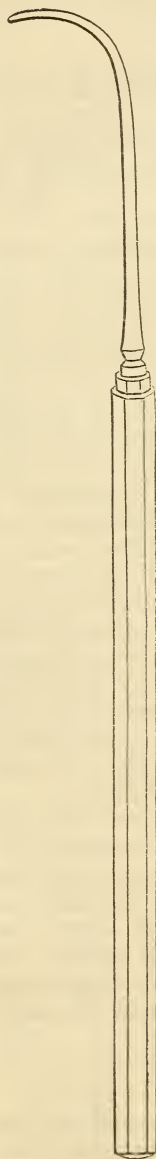
Treatment.—Should it be inflammatory, produced by wounds, lightning, or exposure to intense light; or if there are plethora, headache, giddiness, turgid countenance, and frequent flashes of light when stooping; or if the complaint has followed a suppression of any accustomed evacuation, or the drying up of an habitual ulcer or eruption, then the antiphlogistic treatment must be adopted,—bleeding, cupping, counter-irritants, and purgatives. Should it be atonic, the result of a protracted illness, great loss of blood, over-lactation, leucorrhœa, or other debilitating circumstances, it is attended with pallid lips, dilated pupils, trembling pulse, and despondency of mind. The patient usually sees best after eating, and in a strong light. The discharge or other source of exhaustion should be corrected, and the system strengthened by fresh air, tonics, quinine, steel, good living, &c. The secretions should be well regulated, and the cutaneous and general circulation be promoted by exercise and bathing.

Should it be sympathetic, supervening on jaundice, some disorder of the stomach, or worms, the general health must be regulated before a cure can be expected. It may arise from tumours near the eye and carious teeth, which should be removed. If it follow an injury of the fifth pair of nerves, the wound should be dilated; or if it be healed, the cicatrice must be cut out. Should it follow the use of tobacco or opium, it may be relieved by a cold shower-bath, counter-irritation, and electricity. Should it be organic, the treatment should be palliative.

STRABISMUS.

Strabismus or *Squinting* is the want of harmonious action of the muscles of the eyeball. It may be caused by the overaction or the paralysis of a muscle. The ordinary *varieties* are the convergent, looking inwards, and the divergent, looking outwards: the former is the more frequent. It may be congenital, but usually occurs in

Fig. 50.



childhood. Sometimes it is the *result* of imitation; or it may be induced by marks or patches on the nose; but oftener it is occasioned by gastric or intestinal irritation. Cerebral disturbance is another cause, especially when the squint does not come until adult age.

Treatment.—In childhood, where squinting depends on sympathetic disturbance, it is often removed by purgatives, alteratives, or anthelmintics.

Some cases of squinting may be cured by division of a muscle, but not all; in fact, a deformity sometimes results from the operation.

In almost all cases of squinting, there is defective vision in the affected eye; this defect is usually relieved when the operation is properly performed. The patient should be steadied, as for other ophthalmic operations. The eyelids are to be separated by an assistant or speculum, and the eye not to be operated on is carefully to be bandaged.

The conjunctiva is to be seized by a small toothed forceps, about midway between the cornea and the caruncle, so as to form a horizontal fold, which is to be snipped by the scissors close to the forceps, and between them and the cornea; or, this fold of conjunctiva may be divided by an iris knife. After the division, the conjunctiva is to be separated from the sclerotica for a slight distance. The third step consists in the introduction of a blunt hook, which is curved so as to accommodate itself exactly to the curvature of the eyeball. The hook is to be passed under the tendon, from above downwards; and the muscle now being secure, it is to be divided by a pair of scissors. If the pupil is now in the centre of the orbit, and if the patient cannot turn the eye horizontally inwards, the operation may be considered as complete. Should a portion of the muscle, or some tendinous fibres remain undivided, they are to be sought for by the blunt hook, and divided. If the fascia is too extensively divided, the eye will become too prominent, or an external squint will result.

After the operation cold water is all that need be applied. The operated eye should be exclusively used for a few days. A fungous granulation often rises from the wound, which may be removed by the knife, scissors, or lunar caustic.

GLOSSARY.

Achromatopsia (α, priv. χρῶμα, colour, ὤψ, the eye), want of power to distinguish colours.

Aegilops (αἰγίλωψ, from αἶξ, αἰγός, a goat, ὤψ, the eye), a name given by the older surgeons to a sinuous ulcer at the inner corner of the eye, from its resemblance to the *larmier*, or infra-orbital glandular sac of goats and other ruminating animals.

Albugo (albus, white), an opacity of the cornea.

Amaurosis (ἀμαύρωσις, obscuration, from ἀμαυρόω, to render obscure), impairment or loss of vision from paralysis of the optic nervous apparatus.

Amblyopia (ἀμβλῦς, dull, ὤψ, the eye), impaired vision from defective sensibility of the retina.

Amphiblestroiditis (ἀμφιβληστροειδής, the retina, from ἀμφιβληστρον, a net, and εἶδος, form), retinitis, or inflammation of the retina.

Anchilops (ἀγκίλωψ, from ἄγκι, near, and ὤψ, the eye), name given by the older surgeons to the abscess at the inner corner of the eye, ending in the sinuous ulcer which they called *Aegilops*.

Anchyloblepharon (ἀγκύλος, crooked, βλέφαρον, eyelid), cohesion of the eyelids to each other at their borders.

Asthenopy (α, priv., σθένος, strength, and ὤψ, the eye), weaksightedness.

Atresia (α, priv., τιτράω, to perforate), closure or imperforation; applied to the pupil, &c.

Blepharitis (βλέφαρον, eyelid), inflammation of the eyelids.

Blepharoblennorrhœa (βλέφαρον, eyelid, βλέννα, mucus, ῥέω, to flow), first stage of puro-mucous inflammation of the conjunctiva.

Blepharophthalmia (βλέφαρον, eyelid, ὀφθαλμός, eye), called also *Blepharophthalmo-blennorrhœa*, puro-mucous inflammation of the conjunctiva in its fully-formed state.

Blepharoplegia (βλέφαρον, eyelid, πληγή, stroke or blow), paralysis of the eyelid.

Blepharoptosis (βλέφαρον, eyelid, πτώσις, a falling down), called also simply *Ptosis*, a falling down of the upper eyelid.

Blepharospasmus (βλέφαρον, eyelid, σπασμός, spasm), spasm of the eyelids.

Buphthalmos (βους, ox, ὀφθαλμος, eye), *Oculus Bovinus*, dropsical enlargement of the eye.

Canthus (κανθος, the rim of a wheel), angle of the eye.

Cataract (καταράκτης, from καταρρέω, to throw down with violence, to break or disturb), opacity of the lens or its capsule.

Ceratitis (κέρας, horn, cornea), inflammation of the cornea.

Ceratocœle (κέρας, horn, cornea, κήλη, tumour), hernia of the cornea.

Ceratome (κέρας, cornea, τομή, section), a knife for making an incision of the cornea.

Chalazion (χάλαζα, grando, or hailstone), a small tumour of the eyelid.

Chemosis (χήμωσις, from χήμη, a gaping, from χαινω, to gape; or χέμωσις, from χυμός, humour, or fluid), elevation of the conjunctiva like a wall round the cornea, from exudation into the subjacent cellular tissue.

Choroiditis (choroid, from χόριον, chorion, one of the membranes of the fœtus, εἶδος, likeness), inflammation of the choroid.

Chromatopsy, or *Chromopsy* (χρῶμα, colour, ὄψις, vision), chromatic or coloured vision.

Chroopsy, or *Chrupsy* (χρῶα, colour, ὄψις, vision), chromatic vision.

Cilia (celo, to cover or conceal, because they cover and protect the eye, or from cieo, to move), eyelashes.

Cirsophthalmia (κίρσος, varix, ὀφθαλμός, the eye), a varicose state of the blood-vessels of the eye.

Clavus (the head of a nail), a certain degree of prolapse of the iris, through an opening in the cornea; the prolapsed portion of the iris being pressed flat like the head of a nail.

Collyrium (κολλήριον, from κολλῆρα, a cake; bread sopped according to Scaliger, this being a common application to the eyes), a medicine for the eyes.

Coloboma (κολόβομα, mutilation), applied to fissures of the eyelids and of the iris, congenital or traumatic.

Corectomia (κόρη, pupil, ἔκ, out, τέμνω, to cut), operation for artificial pupil by excision.

Coredialysis (κόρη, pupil, διαλύω, to loosen), operation for artificial pupil by separation.

Coreomorphosis (κόρη, pupil, μόρφωσις, formation), operation for artificial pupil in general.

Coreoncion (κόρη, pupil, ὄγκος, hook), hook invented for the operation for artificial pupil by separation.

Coreplastice (κόρη, pupil, πλαστική, the art of making images), operation for artificial pupil in general.

Cornea (cornu, horn), the cornea is so called from its horny appearance.

Corotomia (κόρη, pupil, τέμνω, to cut), operation for artificial pupil by incision.

Curette (French for a small spoon, David's spoon, an instrument used to assist the exit of the lens in the operation of extraction.

Dacryoadenitis (δακρύω, to weep, ἀδὴν, gland), inflammation of the lachrymal gland.

Dacryocystitis (δακρύω, to weep, κύστις, sac), inflammation of the lachrymal sac.

Dacryo-cysto-blennorrhœa (δακρύω, to weep, κύστις, sac, βλέννα, mucus, ῥέω, to flow), blennorrhœa of the lachrymal sac.

Dacryohæmorrhysis (δακρύω, to weep, αἷμα, blood, ῥέω, to flow), sanguineous lachrymation.

Dacryolites (δακρύω, to weep, λίθος, a stone), calculous concretions deposited in the lachrymal passages.

Dacryoma (δακρύω, to weep), stillicidium lachrymarum.

Diplopy (διπλός, double, ὄψ, vision), double vision.

Distichiasis (δὺς, twice, στίχος, a row), a form of trichiasis in which the mal-directed eyelashes form a second row, distinct from the others.

Ectropium (Ἐκτροπιον, from ἐκ, out, τρέπω, to turn), eversion of the eyelids.

Encanthis (ἐν, in, κανθός, the corner of the eye), enlargement of the lachrymal caruncle.

Entropium (ἐν, in, τρέπω, to turn), inversion of the eyelids.

Epicanthus (ἐπὶ, upon, κανθός, angle of the eye), a congenital peculiarity of a fold of skin extending over the inner canthus.

Epiphora (ἐπὶ, upon, φέρω, to carry), watery eye from excess of lachrymal secretion.

Exophthalmos and *Exophthalmia* (ἐξ, out, ὀφθαλμός, eye), protrusion of the eyeball. Exophthalmos is used when the eyeball is otherwise uninjured; exophthalmia, when, in addition to the protrusion, there is disorganization of the eyeball.

Gerontoxon (γέρων, old, τόξον, a bow), arcus senilis.

Glaucoma (γλαυκός, sea-green), a greenish opaque appearance behind the pupil.

Grando (hailstone), a small tumour of the eyelid.

Gutta opaca, name given by the Arabians to cataract, as they supposed it an opaque drop in front of the lens.

Gutta serena (drop serene), name given by the Arabians to amaurosis, supposing it to depend on a clear drop fallen from the brain into the eye.

Hæmophthalmos, *Hæmophthalmia* (αἷμα, blood, ὀφθαλμός, the eye), sanguineous effusion into the eye.

Hemeralopia (ἡμερα, day, ὄψις, vision), night-blindness. It has been also employed to mean day-blindness (ἡμερα, day, a priv., or ἀλαός, blind, ὄψις, vision).

Hemiopy (ἡμισυς, half, ὄψις, vision), a defective state of vision, in which one half of objects only is seen.

Hordeolum (hordeum, barley), styte.

Hyalitis, or *Hyaloiditis* (ύαλος, glass), inflammation of the hyaloid membrane.

Hydrophthalmia, or *Hydrophthalmos* (ύδωρ, water, ὀφθαλμός, the eye), dropsy of the eye.

Hyperkeratosis (ὑπερ, above, κέρυς, cornea), conical cornea.

Hypoæma (ὑπό, under, αἷμα, blood), blood in the anterior chamber.

Hypochyma (ὑπόχυμα, or ὑπόχυσις, from ὑπό, under, χύμα, effusion), cataract.

Hypogala (ὑπό, under, γάλα, milk), effusion of a milky-like matter in the anterior chamber.

Hypopyon (ὑπό, under, πύον, pus), pus in the anterior chamber.

Iriankistron (ίρις, iris, ἀγκιστρον, a fish-hook), an instrument invented for performing the operation of artificial pupil by separation.

Iridauexesis (ίρις, iris, αὔξησις, growth), thickening or growth of the iris from exudation into its substance.

Iridoncosis (ίρις, iris, and ὄγκος, tumour), a name formerly proposed by Von Ammon for the same morbid state of the iris, as that to which he has since given the name *Iridauexesis*; but now applied to an abscess of the iris.

Iridectomia (ίρις, iris, ἔκ, out, τέμνω, to cut), operation for artificial pupil by excision.

Iridectomedialysis (ίρις, iris, ἔκ, out, τέμνω, to cut, διάλυσις, separation), operation for artificial pupil by a combination of excision and separation.

Iridencleisis (ίρις, iris, ἐν, in, and κλείω, to close), the strangulation of a prolapsed portion of the iris between the lips of an incision in the cornea in certain operations for artificial pupil.

Iridodialysis (ίρις, iris, διάλυσις, separation), the operation for artificial pupil by separation.

Iridoschisma (ίρις, iris, ὄσχισμα, fissure), a fissure of the iris. See *Coloboma iridis*.

Iridotomia (ίρις, iris, τομή, section), the operation for artificial pupil by incision.

Iridoperiphakitis (ίρις, iris, περί, over, φακος, a lens or lentil), inflammation of the uvea and anterior wall of capsule of the lens.

Keratitis (κέρας, horn, cornea), inflammation of the cornea.

Keratonyxis (κέρας, cornea, νόξις, a puncture), corneal puncturation in needle operations for cataract.

Korectomia. See *Corectomia*.

Koredialysis. See *Coredialysis*.

Koromorphosis. See *Coromorphosis*.

Koreplastice. See *Coreplastice*.

Korotomia. See *Corotomia*.

Lagophthalmos (λαγός, a hare, ὀφθαλμός, the eye), oculus leporinus, or hare's eye. Retraction or shortening of either eyelid.

Leucoma (λευκώ, to whiten, or λευκός, white), opacity of the cornea from a cicatrice.

Lippitudo (lippus, blear-eyed), blear eye.

Luscitas (luscus, blind of one eye), fixed misdirection of the eye.

Madarosis (μαδάρωσις, from μαδός, bald), a falling out of the eyelashes.

Marmaryge (μαρμαρυγή, splendour), an appearance of sparks or coruscations before the eyes.

Metamorphopsy (μεταμορφώ, to transform, ὄψις, vision), distorted appearance of objects.

Microphthalmos (μικρός, *small*, ὀφθαλμός, *the eye*), smallness of the eye from imperfect development.

Micropy (μικρός, *small*, ὄψις, *vision*), a state of vision in which objects appear smaller than natural.

Milium (a millet seed), a small white tumour of the eyelids or their neighbourhood.

Monoblepsis (μόνος, *single*, βλέψις, *view*), state in which vision is distinct only when one eye is used.

Mucocele (μυξα, *mucus*, κήλη, *a tumour*), dropsy of the lachrymal sac.

Muscae volitantes (musca, *a fly*, volito, *to fly about*), the appearance of grayish motes before the eyes.

Mydriasis (ἀνδρός, *obscure*, or μυδάω, *to abound in moisture*, because it was supposed to be owing to redundant moisture), preternatural dilatation of the pupil.

Myocephalon (μύα, *a fly*, κεφαλή, *the head*), a small protrusion of the iris, like a fly's head, through an ulcerated opening in the cornea.

Myodesopsia (μύα, *a fly*, ὄψις, *vision*), muscae volitantes.

Myopy (μύω, *to shut*, ὤψ, *the eye*), nearsightedness.

Myosis (μύω, *to shut*), preternatural contraction of the pupil.

Myotomy (μῦς, *a muscle*, τέμνω, *to cut*), section of muscles. Ocular myotomy, section of muscles in strabismus.

Nyctalopia (νύξ, *night*, ὄψις, *vision*), day-blindness. Employed also for night-blindness (νύξ, *a priv.*, or αλαος, *blind*, ὄψις, *vision*).

Nystagmus (νυσταγμός, *steep*), oscillation of the eyeball.

Oculus Bovinus (bos, bovis, *an ox*), ox-eye; see *Buphthalmos*.

Oculus Leporinus (lepus, leporis, *a hare*), hare's eye; see *Lagophthalmos*.

Onyx (ὄνυξ, *a nail*), deposition of matter in the substance of the cornea.

Ophthalmia (ὀφθαλμία, *the eye*), a general name for inflammation of the eye.

Ophthalmia Neonatorum (νέος, *young*), purulent ophthalmia of new-born infants.

Ophthalmitis, inflammation of the whole eyeball.

Ophthalmodynia (ὀφθαλμός, *eye*, ὁδύνη, *pain*), pain in the eye.

Ophthalmology (ὀφθαλμός, *eye*, λόγος, *a discourse*), the science of ophthalmic medicine and surgery.

Ophthalmoplegia (ὀφθαλμός, *eye*, πλνγή, *a blow or stroke*), paralysis of the muscles of the eyeball.

Ophthalmoptosis (ὀφθαλμός, *eye*, πῶσις, *a falling down*, from πίπτω, *to fall*), the protrusion of the eyeball, resulting from paralysis of its muscles.

Oxyopia (ὀξύς, *sharp*, ὤψ, *the eye*), preternatural acuteness of vision.

Pacheablephara, *Pachytes* (παχύτης, *thickness*, from παχὺς, *thick*, βλέφαρον, *eyelid*), enlargement and thickening of the eyelid.

Palpebrae (a palpitando, *from their frequent motion*), the eyelids.

Pannus (pannus, *cloth*), a thickened and vascular state of the conjunctiva corneæ.

Periorbita (περί, *over*), the periosteum of the orbit.

Phlyctenula (φλύκταινα, *a vesicle*, from φλύζω, *to gush forth*), vesicle filled with a watery fluid.

Photophobia (φῶς, *light*, φοβέω, *to dread*), intolerance of light.

Photopsia (φῶς, *light*, ὄψις, *vision*), subjective appearance of light before the eyes.

Phtheiriasis (φθειρίσις, *morbus pedicularis*, from φθεῖρ, *a louse*), pediculi among the eyelashes and hairs of the eyebrows.

Pinguecula (pinguis, *fat*), a small tumour on the white of the eye near the edge of the cornea, apparently but not really adipose.

Pladarotes (πλαδαρός, *flaccid*), thickening of the palpebral conjunctiva.

Presbyopia (πρέσβυς, *old*, ὤψ, *the eye*), farsightedness.

Proptosis (πρό, *before*, πῶσις, *a falling down*, from πίπτω, *to fall*); see *Ophthalmoptosis*.

Psorophthalmia (ψώρα *scabies*, ὀφθαλμός, *the eye*), ophthalmia tarsi.

Pterygium (πτερόν, *a wing*, πτερύγιον, *a small wing*), thickened and vascular state

of a portion of the conjunctiva, of a triangular shape, the apex encroaching more or less on the cornea.

Ptilosis (πτίλωσις, *bald*), falling out of the cilia; see *Madarosis*.

Ptoſis (πτῶσις, *a falling down*, from πῑπτω, *to fall*), falling down of the upper eyelid.

Pupil (*pupilla*), the aperture in the iris.

Retinitis (rete, *a net*), inflammation of the retina.

Rhexis, or *Rhegma Oculi* (ῥήξις and ῥήγμα, *a rupture*), rupture of the eyeball.

Rhytidosis (ῥυτίδωσις, *a wrinkling*, from ῥυτιδῶω, *to wrinkle*), collapsed or contracted state of the cornea.

Sclerotitis (σκληρῶς, *hard*), inflammation of the sclerotica.

Scotomata (σκότωμα, *dizziness*, from σκοτῶω, *to darken*), dark spots seen before the eyes; see *Muscæ Volitantes*.

Staphyloma (σταφυλή, *a grape*), a projection of some part of the eyeball, generally of the cornea and the iris, or sclerotica and choroid.

Staphyloma Racemosum (racemus, *a bunch of grapes*), staphyloma is so called when there is an appearance of several projections.

Stenochoria (στενοχωρία, *narrowness of space*, from στενός, *narrow*, χώρος, *space*), a contraction, applied to the derivative lachrymal passages.

Stillicidium (stillo, *to drop*, cado, *to fall*), dropping of tears from the eye, in consequence of obstruction of the derivative lachrymal passages.

Strabismus (στραβίζω, *to squint*, from στραβός, *twisted*), squinting.

Symblepharon (σύν, *together*, βλέφαρον, *eyelid*), adhesion of the eyelids to the eyeball.

Synchesis (σύγχυσις, *mixture*, from σύν, *together*, and χέω, *to pour*), dissolution of the vitreous body.

Synechia (συνέχεια, *continuity*, from συνέχω, *to keep together*), adhesion of the iris to the cornea or capsule of the lens; in the former case it is distinguished as anterior synechia, in the latter as posterior synechia.

Synizesis (συνίησις, *a falling together*, from συνίζέω, *to set together*), closure of the pupil.

Tarsoraphia (ταρσός, *tarsus*, ῥαφή, *a suture*), suture of the tarsal margins in ectropium of the external angle.

Taraxis (τάραξις, *disturbance*, from ταρασσω, *to disturb*), slight external ophthalmia.

Trachoma (τραχόμα, *roughness*, τραχῶω, *to make rough*), granular conjunctiva.

Trichiasis (τρίξ, *a hair*), inversion of the eyelashes.

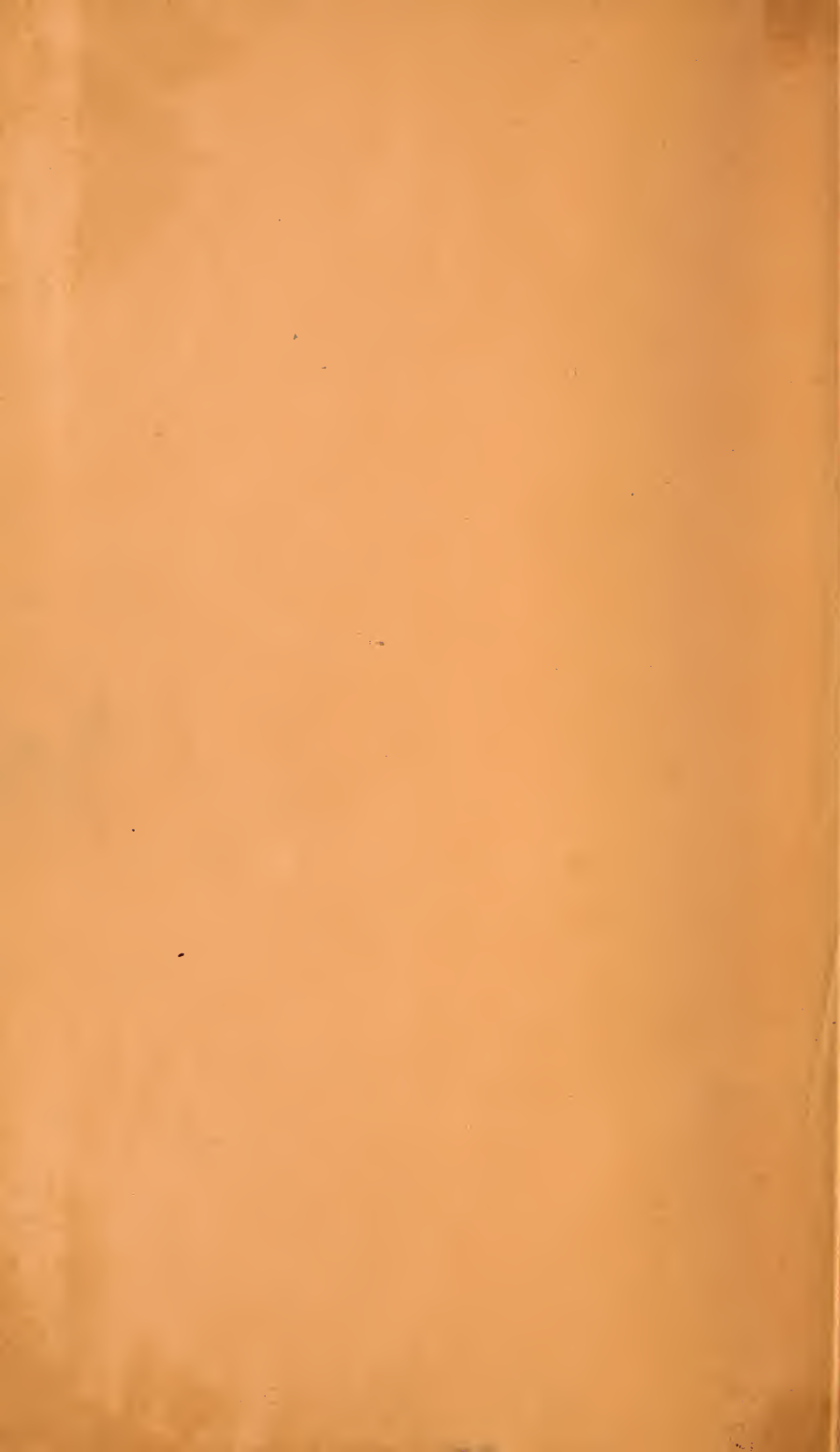
Trichosis (τρίξ, *a hair*), *Trichosis Bulbi*, a small tumour on the front of the eyeball, with hair growing from it.

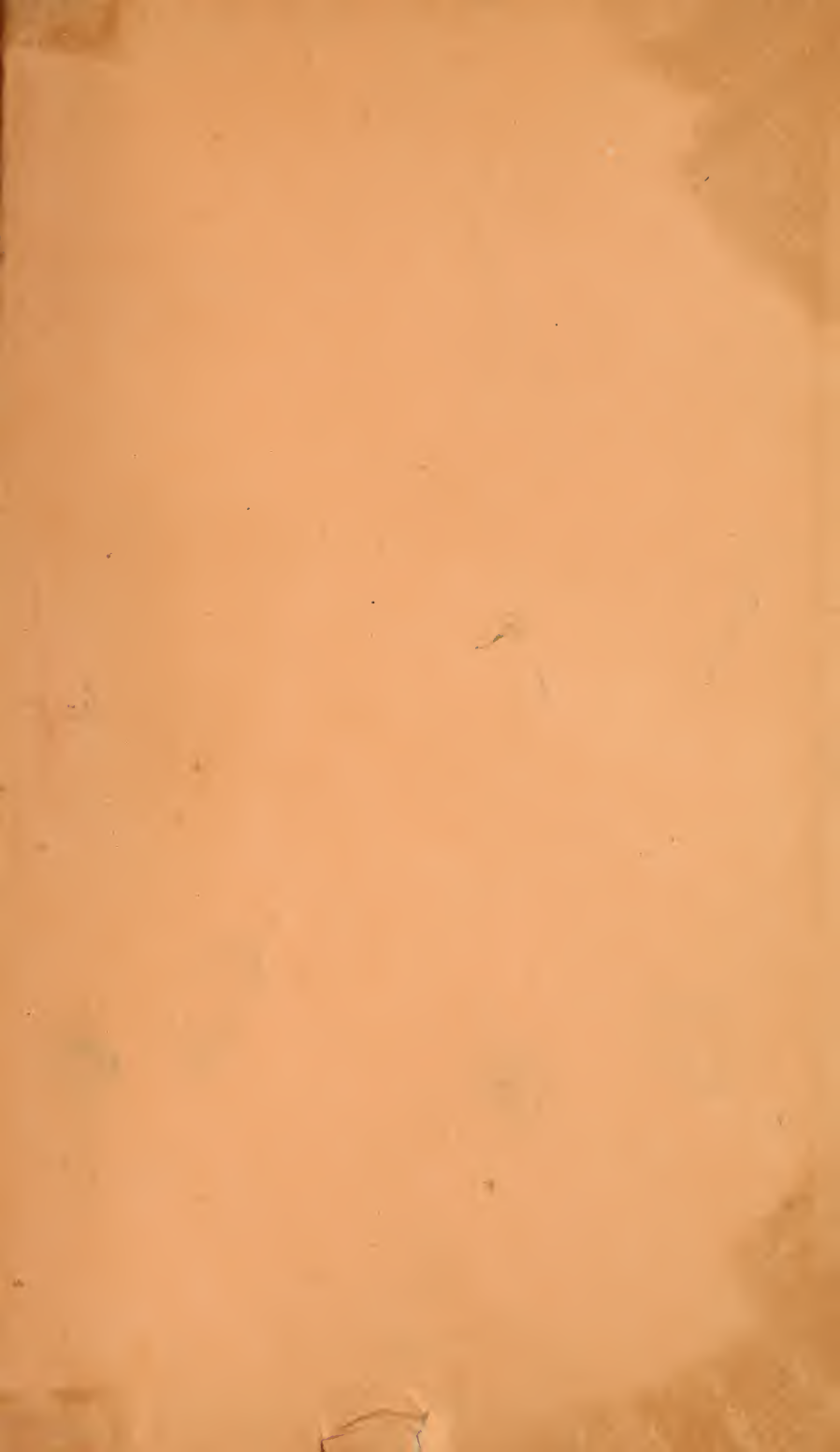
Tylosis (τύλος, *callosity*), thickening and induration of the borders of the eyelids.

Xeroma, *Xerophthalmia*, *Xerosis* (ξηρός, *dry*), dryness of the eye, of which there are two kinds, viz., conjunctival and lachrymal.









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